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Congreso Interdisciplinario de
Energías Renovables - Mantenimiento
Industrial - Mecatrónica e Informática

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ISBN: 978-607-8534-74-6

Sello Editorial ECORFAN: 607-8534

Número de Control AC: 2018-03

Clasificación AC (2018): 101218-0203

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Alentar la interlocución de la Comunidad Científica Internacional con otros centros de estudio de México y del exterior y promover una amplia incorporación de académicos, especialistas e investigadores a la publicación Seriada en Nichos de Ciencia de Universidades Autónomas - Universidades Públicas Estatales - IES Federales - Universidades Politécnicas - Universidades Tecnológicas - Institutos Tecnológicos Federales - Escuelas Normales - Institutos Tecnológicos Descentralizados - Universidades Interculturales - Consejos de CyT - Centros de Investigación CONACYT.

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Colegio de Ingenieros en Energías Renovables de Querétaro A.C.

Octubre 25-26, 2018.

Prefacio

El Colegio de Ingenieros en Energías Renovables de Querétaro A.C. (CIER-QUERÉTARO), y sus capítulos de Energía Renovable, Mantenimiento industrial, Mecatrónica e Informática, patrocinadores técnicos del Congreso Interdisciplinario de Energías Renovables, Mantenimiento, Mecatrónica e Informática, CIERMMI 2018, se complacen en invitarlos a la 3ra., edición de este congreso, que se llevará a cabo del 25 al 26 de Octubre de 2018, en la ciudad de Santiago de Querétaro, Querétaro, México.

El objetivo general establecer un espacio de discusión y reflexión en temas relacionados con las áreas de: energías renovables, mantenimiento industrial, mecatrónica e informática con la participación de estudiantes, profesores, investigadores y conferencistas nacionales e internacionales, promoviendo la conformación y consolidación de redes de investigación. Contribuyendo a brindar un espacio de divulgación y debate de las ponencias de estudiantes, egresados, académicos e investigadores, representantes de las distintas instituciones de educación superior y centros de investigación de nuestro país. Promoviendo la conformación de redes de investigación entre diferentes instituciones. Ofreciendo un espacio para los estudiantes de licenciatura, maestría, doctorado y de posdoctorado, en el cual puedan dar a conocer el avance de las investigaciones que llevan a cabo como tesis o trabajos de grado. Brindando un espacio en el cual los grupos de estudios e integrantes de cuerpos académicos, vinculados al programa curricular de las carreras de energías renovables, mantenimiento industrial, mecatrónica e informática, den a conocer los trabajos de investigación desarrollados al interior de su institución y en colaboración con otras instituciones educativas nacionales o internacionales. Estableciendo un espacio de capacitación para los (las) asistentes, mediante el desarrollo de ponencias y conferencias específicas. Este volumen III-2018 contiene 281 participaciones arbitradas que se ocupan de estos asuntos en elegidos de entre las contribuciones, reunimos algunos investigadores y estudiantes de posgrado, a partir de 32 estados de México. Agradecemos a los revisores anónimos por su retroalimentación que contribuyeron en gran medida en el mejoramiento de los artículos, para la publicación en estos procedimientos revisando los manuscritos que fueron sometidos. Finalmente, deseamos expresar nuestra gratitud al Colegio de Ingenieros en Energías Renovables de Querétaro A.C. en el proceso de preparar esta edición que podras consultar en <http://ecorfan.org/collections.php>

*Santiago de Querétaro, Querétaro.
Octubre 25-26, 2018*

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1 Ciencias Agropecuarias y Biotecnología

Efecto de periodos de luz y sustratos en la germinación de semillas de capiron (*Calycophyllum Spruceanum*) en la Amazonia Colombiana

Effect of light periods and substrates in the seed germination of capiron (*Calycophyllum Spruceanum*) in the Colombian Amazon

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Abstract

In order to determine the effect of substrates and periods of light on the germination of capirona seeds, (*Calycophyllum spruceanum*), the speed and germination percentage of these seeds were studied, under controlled conditions, in the department of Putumayo, Colombia, using a 3x3 factorial design (Substrate and light periods), where two variables were analyzed: the germination speed and germination percentage in a 30-day period. The analysis of variance indicated significant differences ($p \leq 0,05$) for the substrates factor, as well as periods of light and the interaction of these on the variables evaluated. The peat substrate presented the highest percentage of germination ($22.89 \pm 1.14a$) and the highest germination rate ($0.71 \pm 0.03a$), while in the 12 daylight hours photoperiod it showed the highest percentage of germination ($18.22 \pm 1.14a$) and the highest germination speed ($0.56 \pm 0.0290a$). The interaction of factors indicated that for both germination percentage and germination rate, peat * 12 daylight hours showed the highest values ($44.67 \pm 1.98a$) and ($1.34 \pm 0.05a$) respectively. It is recommended to include the peat substrate and the 12 daylight hours photoperiod in the germination protocols of seeds of Capiron (*Calycophyllum spruceanum*) in Amazonian conditions.

Viability, Latency, Physiology

Caracterización morfológica y agronómica de 5 variedades de higuera (*Ricinus communis*) bajo sistema de riego

Morphological and agronomic characterization of 5 varieties of castor bean (*Ricinus communis*) under irrigation system

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Abstract

Currently there is a problem from the social, environmental and economic point of view: climate change, environmental pollution and oil depletion. *Ricinus communis* represents an alternative to overthrow it. The morphological and agronomic characterization of 5 varieties was carried out by measuring height, stem diameter, number of bunches, and % germination under irrigation system. The species complies with the agronomic conditions of adaptation to marginal areas, low water requirements and high yield potential. In germination, 50% was reached due to the lack of moisture in the soil. The variety Guanajuato 05 turned out to be the most robust because it reached a stem diameter of 10.5 cm, Criolla Grande classified as a tall variety and Guanajuato Oil obtained a greater number of clusters (32) at 168 days after sowing although there is no significant difference with respect to the variety Café-Ixmiquilpan with 28 clusters.

***Ricinus Communis*, Morphology, Irrigation**

2 Biología y Química

Estudio del comportamiento térmico de un polipropileno isotáctico (iPP) en estado puro y nucleado con wollastonita

Study of the thermal behavior of an isotactic polypropylene (iPP) in pure and nucleated state with wollastonite

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Abstract

Knowing that the beta phase in the iPP provides greater mechanical strength and the difficulty of obtaining it through a typical dynamic process, leads to adapt operating conditions of a system based on extruder and modified cooling tank, initiating study of the thermal behavior of an iPP in state pure and nucleated with wollastonite in 6 concentrations, using Differential Scanning Calorimeter (DSC), to determine critical values of crystallization parameters, and induce beta phase in a cast film. The iPP used was obtained from the process of a plastic packaging manufacturer and three thermal protocols were applied with consecutive isothermal and non-isothermal stages whose conditions simulated the sudden changes in temperature of a typical dynamic industrial process. This iPP crystallized under annealed conditions, both in its pure and nucleated state, at a single $T = 116^{\circ}\text{C}$. In conditions of quasi-tempering at low cooling rate it behaved similarly in the range of $107\text{-}111^{\circ}\text{C}$ according to cooling rate. The application of consecutive non-isothermal and isothermal stages produced displacements in onset and melting temperatures showing crystallization within the beta-phase induction temperature range in addition to alpha phase, determining melting heat changes between first and second crystallization.

Isotactic Polypropylene, Beta Phase, Industrial Dynamic Process

Biodegradación de los hidrocarburos totales del petróleo en agua de lavado de un suelo contaminado con diésel utilizando bioestimulación, lodos activados y gallinaza

Biodegradation of the total petroleum hydrocarbons in wash water from a dieselcontaminated soil using biostimulation, activated sludges and poultry manure

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Abstract

We studied the degradation of total petroleum hydrocarbons (TPH) in water from washing of a diesel-contaminated and weathered soil, through: bio-stimulation (aeration), activated sludges, and activated sludges with added poultry manure in aerated laboratory-scale batch reactors, which were operated for 15 days. The problem water with 1,100 mg/L of TPH and 1,875 mg/L COD was obtained from the washing of the contaminated soil, applying a 0.5% solution of guar gum. The activated sludges were conditioned with TPH in concentrations that were gradually increased up to 1000 mg/L. The manure was directly added in a 3.5% m/v ratio to a reactor with TPH-conditioned activated sludges. A C:N:P ratio of 100:4 P: 0.5 was kept in all the reactors. For the aerated reactor, a maximum 53% of TPH and 47% of COD removals was observed, because this process bio-stimulated the hydrocarbonoclast indigenous microorganisms from the weathered soil. For the reactor with conditioned activated sludges the reductions were 78% of TPH and 61% of COD. And those for the reactor with added chicken manure were 98.6% reduction of THP and 79% of COD, which were reached from the 3rd day of the experiment.

Total petroleum hydrocarbons, Bio-stimulation, Activated sludges, Poultry manure

3 Ciencias Sociales

Reflexiones sobre Redes Sociales

Social Networks Reflections

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Abstract

In this article, a formal exposition of concepts associated with social networks is presented, using discrete mathematics theory. Conceptual maps with logical structure are also used to clarify the arguments of some points. This document makes a review of works related with this subject and exposes a reflection on the fragility of the speeches to justify social, economic, political and/or cultural phenomena through evidence that are based on social networks. Being social networks a complex, dynamic and subjective phenomenon, the insertion of formalities in their description, allows expanding the analysis, simulation, forecasting, and control of specific situations that are based on data from portals where are formed, modified and/or interact social networks. Finally, a series of research questions are shown that are extracted from the approaches mentioned throughout the document and that makes it easier to extends the research that allows assertively to respond to the change in social dynamics caused by the use of information technologies and communication.

Social networks, Social research, and Social theory

Elaboración de hojas de operación estándar para el mantenimiento del servicio mayor de una empresa automotriz del Sur de Sonora

Elaboration of standard operation sheets for the maintenance of the major service of an automotive company of the South of Sonora

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Abstract

Automotive companies are increasingly competitive, with a common goal of providing excellent customer service, reduce costs and increase profits. The project was developed for an automotive company in the south of Sonora, in which the objectives were not fulfilled in the service workshop, so it was determined the need to elaborate the HOE (Standard Operation Sheets) by model of the vehicle in the mechanical process of the major service. The lack of HOE's caused inefficiency in the process, leisure time for technicians and customer complaints. The procedure of this investigation was structured by the following steps: describe the area under study, analyze the generic HOE, determine the activities that must be carried out for each model, determine the times of each activity, update generic HOE, elaborate and validate HOE's of each vehicle model. By standardizing the operations, they ensured that the technicians' activities were safer and more effective, the productivity and the sequence that the technician performs when carrying out the major service activities were improved. At the end of the project, the HOEs were produced as a result, whose impact was the standardization in the mechanical process of the major service.

Maintenance, Major Service, HOE

Análisis de la aplicación de los métodos de interpretación jurídica gramatical y sistemática al artículo 36, fracción II de la LISR en México

Analysis of the application of the grammar and systematic legal interpretation methods to article 36, section II of the LISR in Mexico

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Abstract

The laws are of public order so it can be assumed that any natural person can understand and apply them in a correct way; but this in real practice does not happen like that. Therefore, this article presents a descriptive study to show the discrepancy that exists in the application of grammatical and systematic legal interpretation methods of article 36, section II of the Income Tax Law in Mexico. To achieve the above objective, a review of the existing literature was made with respect to the interpretation of the legal norms and the Income Tax Law, specifically the aforementioned article. Subsequently, a hypothetical example of an investment in a new car is presented and the amount to be deducted is determined by the method of grammatical interpretation and the systemic method; The results are analyzed in which the discrepancy in the amounts to be deducted can be observed when applying the methods already mentioned; which represents an area of opportunity to clarify in the current legislation of article 36, section II of the Mexican Income Tax Law.

Methods, Legal, Interpretation

Reflexión sobre la enseñanza estratégica para el aprendizaje en la Práctica Clínica I y desarrollo de competencias en estudiantes de Fisioterapia en la Universidad Politécnica de Amozoc

Reflection on the strategic teaching for learning in the Clinical I Practice and development of competences in Physiotherapy students at the Polytechnic University of Amozoc

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Abstract

The present study addresses constructivism in education based on teaching-learning strategies that favor meaningful learning and the development of competencies, knowledge integration, attitudes and values, in which a reflection is made on strategic teaching for meaningful learning in Clinical Practice I and development of competencies in Physiotherapy students of the Polytechnic University Amozoc, The intervention by the teacher favors the learning so it is essential to develop a strategic planning that integrates strategies in a social way that requires the active work of the student before the resolution of a problem, examining possible solutions by means of the execution of techniques, procedures and support methods for which a study of type: explanatory, interventional, longitudinal, prospective, prolective, unicentric through the application of strategies such as study d e cases, model, comparative table and workshop. The objective of this study is to demonstrate that the teacher through strategic planning that adjusts to their needs, favors the significant learning and acquisition of general and disciplinary competences of the students so that they establish a diagnosis and plan of physiotherapeutic intervention in a social context.

Competencies, Teaching-learning strategies, Physiotherapy

Aspectos legales y prácticos del uso y desarrollo de la computación en nube

Legal and practical aspects of the use and development of cloud computing

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Abstract

Cloud computing has now proliferated in an extraordinary way in various work, professional and educational fields. In Mexico efforts have been made to cover the legal aspects involved in the use of such an important service, trying to solve the existing gaps, since the advancement of technology has exceeded the time of legislation of the same. It is noteworthy that the legislation regarding cloud computing, not only includes the Mexican norms, but also the corresponding international norms ones according to the location of the service provider. The objective of this research is to identify the legal aspects of cloud computing based on the generalities that identify its use and application in current organizations. It is a documentary and descriptive investigation and its main contribution prevails in the compilation, interpretation of the legal aspects of cloud computing applied to a real case.

Cloud computing, Legislation, Technology

Bases sencillas para iniciar un negocio (PYME)

Simple bases to start a business (PYME)

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Abstract

When you start your business you need bases and know the procedures to undertake it. The purpose of the companies is to serve customers, observe competitors and their environment because we are in a very competitive market. Companies need qualified people who know how to manage. As you know the administration began to be studied since the twentieth century. There is the kind of person who is dedicated to talking about your product or service but few emphasize the client. The success of a company depends on the administration of resources and resources. Every project follows phases of studies. The decision to invest depends on the evaluation and the profit. The first part of the project includes the organization, business plan to start any investment project. The second part includes the market study and finally the economic evaluation. It is very important to do an external and internal analysis where the environment surrounding the business is known.

Business plan, Bases, Project feasibility

Estudio del impacto de las habilidades directivas, en una institución de educación superior en el sureste de México

Study of the impact of managerial skills in a higher education institution in southeastern Mexico

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Abstract

Goals Analyze modern societies that are currently impacted by constant transformations: technological, economic, educational and cultural. This also affects public higher education institutions. Faced with this reality, new approaches are required related to the ways and means of conceiving the teaching practice, but, above all, the managerial or managerial practice, in order to guarantee the fulfillment of its diverse functions and, therefore, achieve its objectives. institutional Methodology: The tool to measure the abilities and skills that the organization has in the positions of high command, is through administrative audit with emphasis on innovation and creativity for organizational development. The basic orientation of the research was to seek new strategies in relation to managerial skills based on perspectives of creativity and organizational innovation. Contribution: As it could be verified according to the results of the research, interinstitutional communication is the factor that most impacts the development of managerial skills, for which an integral model is designed so that starting from the above, a significant change can be made in the development of managerial functions in the academic field.

Skills, Innovation, Creativity

4 Ciencias Físico Matemáticas y Ciencias de la Tierra

Solución de un problema de parámetros robustos con una variable de ruido cualitativa

Solving a robust parameter problem that includes a qualitative noise variable

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Abstract

Response Surface Methodology has been widely used to solve robust parameter problems that include control variables such as quantity of material, temperature, pressure, time, etc. and noise variables difficult or impossible to control such as humidity, room temperature, etc. The noise variables included in the problems so far have been quantitative. However, these noise variables could be qualitative: type of machine, operator, type of supplier, etc. The article proposes a response surface methodology when there is a qualitative noise factor. The first steps of the investigation are explained in detail: construction of the general regression model, assumptions of the model, design of the steps of the methodology, simulations using the methodology and the solution of a case with one quantitative control variable and one qualitative noise variable, in addition to results that demonstrate the effectiveness of the methodology.

Response Surface, Qualitative Noise Variables, Dual Response Surface Methodology

5 Humanidades y Ciencias de la Conducta

Descubriendo el uso que le dan los estudiantes de informática a las redes sociales (Caso: DAIS-UJAT)

Finding the use given by computer students to social networks (Case: DAIS-UJAT)

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Abstract

Social networks are part of our daily lives and the importance they have today is evident and indisputable, which have changed the way we communicate with friends, colleagues or even with teachers and classmates. Social networks are powerful tools that allow individuals to interact, but also develop skills and abilities such as socialization, teamwork or the importance of sharing, developing communication skills. In view of this situation, this quantitative study was carried out, with a descriptive exploratory approach, whose objective is to know the use given to social networks by students in the computer science area of the Universidad Juárez Autónoma of Tabasco. To this end, a questionnaire was used as a data collection instrument that was applied to the target population. Observing in the results, which networks have been used more frequently by students, as well as among the reasons for their use, it can be seen that they are already used in the educational field and for what purposes the teacher uses them.

Social networks, Computing, UJAT

Diseño y desarrollo de actividades de integración a nivel preescolar utilizando la tecnología

Design and development of integration activities at preschool level using technology

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Abstract

The present investigation shows the way of designing educational activities according to the Preschool Program supported with the use of technology. In such a way, that with the strategies, the specific objectives, the competences; which are indicated in said Program and together with the collaborative work and the technology; strengthen meaningful learning in a group of first grade of preschool. To enhance the skills, attitudes and skills of the students, a work plan was designed in which the way to use technology with the use of the Robot NAO from the Universidad Politécnica de Amozoc, Puebla is described and thus design and develop planned activities as established by the Preschool Program; which start from a methodology using a technological strategy. The general objective is to carry out the design to develop integration activities at the preschool level using technology. The results obtained were the improvement of skills, attitudes and aptitudes among the children, the educator, the rules established in the classroom, their empathy among peers and sometimes in the subsequent tasks they perform at home.

Educational activities, Preschool Program, Technology

Estudio de participación de cuerpos académicos con producción académica

Study of the participation of academic groups in a higher institution

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Abstract

The present work shows the case study of institution belonging to the Coordination of Technological and Polytechnic Universities CGUTyP, it requires a diagnosis of the Full Time Professor PTC, integrated in Academic groups CA's, with profile Program for Professional Development PRODEP, System Nacional de Investigadores SNI, participation in social research networks for collaboration of research lines. The objective is to know the academic production and participation of CA's members; the methodology used is documentary through the analysis phase of the academic products during the 2017 period, percentage calculations were made of the participation of the PTC, where 59% PRODEP profile was obtained, 5% SNI level "I", and 20 % ResearchGate, 0% ORCID, the participation is 12 men representing 4.8% and 5 women representing 2%, the total is 6.8%, in research period 2017, it can be seen that the participation is less than 50% of the PTC, and 28% of PTC do not participate in research activities, the study allowed the research direction, initiate a plan of training and management of technical and economic resources for members of the CAs can increase their academic production.

Groups Académicos, PRODEP, Collaboration Networks

Videos educativos como propuesta para la adquisición de la competencia digital informacional

Educational videos as a proposal for the acquisition of digital information competence

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Abstract

Over the years in Mexico, various programs have been created to integrate Information and Communication Technologies (ICT) in the classroom, trying to achieve a quality education and develop life skills, contributing to the development of skills demanded by the knowledge society. It should be pointed out that the important thing is not the use of technology, but the learning and development of the digital competences to which its use entails. One of the digital competences that every citizen should have, is information competence; This implies, among other things, searching, selecting, analyzing and evaluating information. However, one of the problems in Internet searches is the amount of existing information. A search engine finds web pages that respond to requests made by users, however the results it throws does not imply that they are the ones that the user requires or that are the most important. Due to the above, there is a proposal to contribute to the development of this competence through the creation of didactic videos, since these have the characteristic of facilitating the transmission of knowledge and the assimilation of them.

Digital skills, Videos, Search engines

La cohesión grupal, estrategia clave para disminuir el índice de deserción en el primer ciclo escolar en la educación superior

Group cohesion, key strategy to reduce the dropout rate to the first school cycle in higher education

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Abstract

The classroom is a micro-society whose essential purpose is to elaborate shared knowledge in a framework of interaction (Roselli, 2011). For Roselli, the success in the generation of knowledge is linked to the adequate interaction between students, the group activity and the application of collaborative learning techniques. Through the adequate organization of work groups by teachers, it facilitates the approach and realization of a common task, which promotes the interaction and distribution of responsibilities in order to achieve a goal. In this way, cohesion, the sense of belonging and, consequently, the generation of identity through recognition in a social sense are favored among the members of the classroom. This article presents an analysis that questions whether the lack of group cohesion in higher education students motivates them to make school dropout decisions. A study is shown with the results obtained when considering group cohesion as an element to decrease the dropout rate.

Group Cohesion, Dropout Rate, Collaborative Learning

Aplicación de proyectos transdisciplinarios como estrategia de evaluación

Application of transdisciplinary projects as evaluation strategy

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Abstract

Currently, most of the companies request from the universities graduated students who have particular knowledge in the specialty area, such as any of the processes or procedures that they will apply for their activities, they consider it of paramount importance that when they graduate, they also count with social competences, such as basic social skills, receptive and expressive communication, among others (Bisquerra, and Pérez, 2007), this in order to have an assertive social interaction in the company, both with their counterparts, holders, and with the subordinates. One of the concepts considered in this project is transdisciplinarity, which is based on carrying out integral projects together with several specialties, whose culmination is a complete and functional product, with solid technical and administrative bases. For all the above, a work proposal was made for entrepreneurship students of the Polytechnic University of Gómez Palacio, which consists of implementing transdisciplinary projects, whose contribution is the creation of innovative objects, which have a creative sense, that give back financially. To its creators and be promoters of new knowledge.

Transversality, Innovation, Entrepreneurial

Evaluación socio-económica de una propuesta para el incremento de titulación por experiencia laboral en una institución de educación superior

Socio-economic evaluation of a proposal to increase the degree by work experience in a higher education institution

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Abstract

Due to the strategic importance of higher education in contemporary society and the low rate of terminal efficiency, the Technological Institute of Sonora (ITSON) has looked for strategies to increase the level of academic qualification index, therefore, this research aims to evaluate the addition of resources to improve the performance of academic qualification index, supported by Professional Merit strategy on Work Experience modality. The procedure was based on the general methodology for the evaluation of projects proposed by the Center for Studies for the Preparation and Socioeconomic Evaluation of Projects (CEPEP). The main resource considered by the proposal was the use of a person to contact, assist and follow graduates up who accomplished the qualification requirements. The results from evaluation of the proposal show additional institutional income of \$758,072 as well as additional society income of \$ 3,006,124. Although the current situation has a positive value, the optimization with the proposal presents even better performance. Therefore, the objective of the present investigation was achieved and it was recommended to implement the aforementioned proposal as soon as possible.

Terminal efficiency, Degree index, Convenience, Socioeconomic evaluation

La motivación como elemento compensatorio para el desarrollo de estrategias didácticas en programas de licenciatura por competencias

Motivation as a compensatory for the development of teaching strategies in degree programs by competences

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Abstract

This text is the preliminary result of a research project which aims the assessment of the factors related to the motivated learning of students of 9 different ITTG´S (TecNM) Bachelor degree programs carried out by competences. It analyses the motivations that led students to enroll in the bachelor program degree they are studying and their professional expectations at the end of their studies by applying a questionnaire and using a Likert scale will know characteristics of students who are more and less motivated to enter this institution and correlate it with the degree of drop-outs and graduations, which would allow refocus didactic motivation, avoid dropping out and allow higher degrees of graduation. Systematic stratified random sampling allowed choosing the 148 students who participated in a pilot test. Starting the analysis of results, it is possible to see a differentiation of motivated learning and a greater certainty of the goals to achieve, different attitude towards learning oriented to professional success, which has variations and good job expectations, and is followed by vocational and development reasons staff, highlight the issues that they believe are valued for work such as previous work experience, complementary studies and personal networks.

Objectives: To know preliminary the degree of motivation to continue their careers in students of 9 different degrees

Methodology: The representative sample was selected by stratified random sampling, a survey of Self-perception of personal academic motivation; the data was analyzed globally and by Bachelor's degrees.

Contribution: Preliminary analysis of the degree of motivation as an important element to avoid the defection and/or the reproach in undergraduate students (Engineering)

Motivation, Didactic strategies, Competences

La importancia del desarrollo de habilidades directivas para la consolidación de liderazgo empresarial

The importance of developing management skills for the consolidation of business leadership

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Abstract

When a young professional graduates from his university career he faces a very different reality, where in principle he stops being a student to play the role that his profession demands, and immediately he is required to have the necessary skills to start his working life. Likewise, the personnel that has worked in operational positions, when obtaining a promotion to a managerial vacancy within an organization, must develop skills to exercise in a more strategic than operational manner. That is why managerial skills play an important role in the modus vivendi of society itself, since people develop in a world of work that requires, in addition to knowledge, the abilities and skills to perform productively and generate competitiveness of their context. The present work is a correlational analysis between the managerial development and the existence of leadership, in an organizational system, since the lack of the latter outlines competitive deficiency in an institution or company, and even within a determined sector.

Managerial skills, Leadership, Intellectual capital

Desarrollo e implementación de instrumentos de medición de factores de riesgo suicidas y software de captura de información y contacto-seguimiento para alumnos de nivel secundaria y bachillerato

Development and implementation of measuring instruments of suicide risk factors and software of capture of information and contact-follow-up for secondary level and baccalaureate students

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Abstract

According to studies, statistics about attempts of suicide are alarming, but something that is worrying is that only 20% of them receive specialized attention. Some detonating factors are indicated, such as the death of a close relative, hostile growth environments where suicides have occurred, mental health, impaired family finances, and compulsive changes in behavior. 8 out of 10 young people who try to commit suicide study, that gives the opening to contact them and generate help mechanisms for their situation. This project is focused on applying information collection instruments for students of secondary and high school educational institutions, with the purpose of detecting risk factors indicating suicide, and the development and implementation of a web application to gather this information, generate statistical reports and contact follow up to the students. The effectiveness in the implementation of this project lies in the support of the institutions, since that is where a treatment and channeling contact is generated, this makes it possible to ensure that one of the best solutions to the problem of suicides is the accompaniment of young people in their stage of academic training, from all aspects: family, tutorial, sports and psychological.

Web Application, Suicide, Channeling

Estimación de los niveles de estrés mediante el análisis de señales electroencefalográficas de estudiantes en Evaluación Permanente de Ingeniería Electrónica detectados con riesgo de síndrome Burnout

Estimation of the stress levels through electroencephalographic signal analysis of Electronics Engineering students in Permanent Evaluation detected with Bournout risk

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Abstract

A pilot test to determine the stress level presented by Electronic Engineering students in Permanent Evaluation (PE) via the processing of electroencephalographic signals is shown. The PE is the third and last chance a student has to approve a course in order to not drop out school. The school's psychopedagogical service detects the students with low performance in PE status and also a control formed by the same number of students with good performance in regular status and via an individual interview structured by the Maslach Burnout Inventory-Student Survey (MBI-SS) questionnaire the Burnout is confirmed or not. Then an individual psychosocial exploration interview for both groups is made and video recorded while the electroencephalographic register is taken in order to detect important events. Finally, these signals are processed with spectral analysis in order to know the power in frequency bands associated with stress.

Electroencefalogram, Academic bournout, Estimation

Proceso metodológico para la implementación de un proyecto integrador como estrategia de enseñanza en el ámbito docente

Methodological process to application of an integrative project as a teaching strategy into the teaching field

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Abstract

Teaching techniques and strategies for training of students in higher education institutions have prevailed in constant change, however, many of them have not been developed and implemented in a real context. Integrative projects contribute to develop three knowledges of students, know- to know, know-to do and know-to be; although its execution and acquisition implies a complex process. This work contains a description of methodological process for implementation of projects from a pedagogical perspective applied in micro and small companies, it describe elements to be considered to planning, development, execution and closing of project, factors that limit the organization and management of groups; it also includes an analysis of the impact of the project application to reduce the reprobation rate of the subjects, the personal and professional development of the student, and the contribution to companies. Integrative project as a teaching strategy contributes to strengthening and development of new experiences and knowledge in the educational field.

Methodology, Integrative Project, Teaching

La colaboración científica entre los investigadores de la Red Temática de Bioenergía en México

Scientific collaboration among researchers of the Bioenergy Thematic Network in Mexico

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Abstract

The objective of this research is to present the scientific collaboration of the members of the thematic network of bioenergy from the perspective of social network analysis, the methodology used was the analysis of the co-authorship of the researchers members of the network in articles published in prestigious journals that belong to the consortium Conricyt and under the central variables of degree, intermediation and proximity and the variables of structure, modularity, density, diameter and grouping coefficient. The results show that 48% of the members are researchers or teachers and that 18% of them presented collaboration with at least one other member of the network. The structure variables show 14 subgroups, a low coefficient of grouping and density and although subgroups with important central measures were detected, it is detected that these variables generally favor very few researchers, showing that work is not favored in network with respect to co-authorship in journal articles.

Social networks, Co-authorship, Central variables

Habitabilidad ambiental en vivienda de clima cálido seco: Patrones relevantes no evidentes

Environmental habitability in housing of dry hot climate: Relevant non-obvious patterns

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Abstract

A research project was carried out in different cities of Mexico on the conditions of environmental habitability, urban habitability and social cohesion that appeared in the series construction housing; in which indicators and indices for the study of habitability conditions were identified. The objective of this article was to identify those relevant patterns that had not been evident in the study of environmental habitability in an extreme dry warm climate, such as that of Mexicali, Baja California. The above was carried out based on the database of the mentioned project field work; the statistical analysis was performed with the SPSS program version 21, the variables were coded according to their nature, the study of the nominal variables was particularized, the statistical test χ^2 was used to accept or reject the hypothesis test through the levels of significance. The dependence and independence relationships of the variables were determined, and they identified those that were not evident (level of significance less than 0.05), and that had not been considered in the elaboration of the indicators.

Environmental habitability, Relevant patterns are not evident, Levels of significance

Diseño y Evaluación de un Objeto de Aprendizaje en el área de Informática con la metodología ADDIE

Design and Evaluation of a Learning Object in the area of Computing with the ADDIE methodology

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Abstract

At present, the use of digital educational resources has strongly influenced as support tools of various educational modalities, models and educational environments and proposals for teaching materials that seek to strengthen student learning. One of these educational resources are learning objects (OA) of which we are sure that as tools of educational innovation contributes effectively to the field of education, this research aims to present the necessary elements for the design and evaluation of an OA which allows to analyze the levels of competences of university students with respect to the knowledge and practice of the data structures piles in the programming language java with the purpose of improving the performance that the student develops during the course of analysis of algorithms. There are different methodologies for the instructional design of the LOs, however for the design of the learning object in question it was carried out under the ADDIE methodology having as a contribution the implementation of LO, its evaluation and its validation to be integrated as part of the resources of the Degree in Administrative Computational Systems of the Universidad Veracruzana.

Learning Objects, Programming, Education

Estudio de la productividad del sector hotelero del estado de Tabasco para la generación de una propuesta de desarrollo

Study of the productivity of the hotel sector of the State of Tabasco for the generation of a development proposal

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Abstract

The present study analyzes the productivity of the hotel sector that is located in the state of Tabasco for the design of an improvement proposal. The results of a self-diagnosis carried out at six hotels that are part of the hotel sector and that were selected by verifying their impact in the context of action, are considered in order to identify the critical factors that affect the productivity of the hotel industry in the always considering the variables of the context. The methodology that was used from the selection of the experts was the Delphi method, allowing them to have the key elements to develop the criteria and factors, and thus obtain the information that is then analyzed in the integral diagnosis, by means of graphs that in a more practical way, they allow the results to be more evident. It should be noted that based on the variables of the context, the specific factors that affect them were interrelated. This led to the comprehensive proposal of a model for the improvement of productivity in the hotel sector of the state of Tabasco, always with an integral approach.

Productivity, Improvement, Integral

Estudio de los hospitales de alta especialidad del sector privado en la ciudad de Villahermosa, Tabasco, para la generación de un modelo de desarrollo de la productividad

Study of high specialty hospitals of the private sector in the city of Villahermosa, Tabasco, for the generation of a development model of the productivity

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Abstract

Productivity is fundamental for today's organizations, not only for transformation organizations, but also for those that provide services. This is the case of the present investigation that focuses specifically on the study of the health sector taking as reference the High Specialty Hospitals of the private sector, in the city of Villahermosa, Tabasco. The research is carried out through a systemic and comprehensive approach, considering both internal and external elements that affect productivity, therefore, ten elements have been established that include current priority aspects to achieve productivity and therefore the quality of organizations. It should be noted that the compilation according to the information contained in the aforementioned elements is taken directly from the experts linked to the study context. It is important to note that the participation of the leaders in the self-assessment is of great importance to have a comprehensive outline of the organization's scenario. In the present investigation different strategies were managed to achieve real participation.

Objectives, Methodology, Contribution, Productivity, Hospitals, Comprehensive approach

Análisis de la operatividad del programa institucional de tutorías en el Instituto Tecnológico Superior de Tamazunchale, San Luis Potosí

Analysis of operability of the institutional program of mentorship at the Higher Technological Institute of Tamazunchale, San Luis Potosí

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Abstract

Mentorship is a personal and academic support throughout the educational process to improve academic performance, facilitate the problem-solving process of students in the Institute Technology of Tamazunchale, develop study habits, work, reflection and social coexistence. (ANUIES, 2000). The results shown in this article contain information concerning the analysis of operability of the Institutional Program of Mentorships in an institution of higher education, whose objective is to verify its effectiveness to try to fulfill the requirements of the Council for Accreditation of the Teaching of Engineering (CACEI), determining opportunity areas to improve the program. For this reason, they are taken as a reference from an administrative and academic point of view, including the analysis of the three years taken as a basis to carry out this analysis beginning in 2014, until December 2016. The processing of information was carried out by means of estadistical graphics in Excel.

Tutorship, Analysis, Operability

Una nueva forma de enseñar TIC con aplicación e impacto en el contexto del estudiante

A new way of teaching ICT with application and impact in the context of the student

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Abstract

This article aims to explain the reasons why postgraduate students of all educational levels in the Mezquital Valley do not put ICT into practice as explained in their classes, in order to make adjustments to the planning or the way in which the subject of new technologies applied to education is imparted, as well as the factors to be able to understand the context in the State of Hidalgo, Mexico, to later disseminate this article to raise awareness in educational institutions, as well as the graduates themselves to support the dissemination, but the most important thing will be the continuous and contextualized improvement that is not done in teaching, not only to fill the student with theories, but also to know the context and their interests for to be able to have a class that makes sense for them, that is why this work will give a better teaching to future students and gives the experience so that this subject other teachers can do the same for the benefit of students, who are very hopeful of significant and individualized learning.

ICT, Teaching, Mezquital Valley

Ecological Museums: Sustainable tourism and restoration of biodiversity

Museos Ecológicos: Turismo sustentable y restauración de la biodiversidad

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Abstract

This transdisciplinary research promotes the restoration of biodiversity and tackling climate change through a critical museology that starts the inter-institutional development of a Network of Ecological Museums in Mexico, with an educational model with immediate action that acts on the basis of sustainable tourism, social entrepreneurship and cultural identity. The first case –Magic Town of Mazunte, Oaxaca - plans an archaeological/ecological museum that disseminates ancestral roots and regional biodiversity, to the mexican people and international tourism. The museum will seek to promote ecological awareness in all social and productive sectors; and one of the fundamental strategies will be using high-impact spectacular exhibitions through multisensory exhibitions operated by mechatronics and clean energies within an ecological-demonstrative architecture. The museum will promote the restoration of ecosystems through ecological engineering that allows the cultivation of regional domestic flora for diverse markets, with community economic benefit, and through preservation strategies that encourage the protection of local fauna on earth/coast/sea. It will have cybernetic educational technology to widely extend free environmental instruction; in addition, it will have documentation centers, eco-technological training and civil protection in a region (until today) marginalized and with high social risks due to the threat of natural disasters.

Ecotechnics, Mechatronic, Educational technology

El desarrollo profesional docente en la educación superior

Teacher professional development in higher education

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Abstract

The National System of Higher Technological Education in Mexico (SNEST), like others in the world, has reformed its educational models and with it its curricula, looking for the best alignment with students' exit profiles; so that upon graduation, they obtain the required competencies so that they can adapt to global dynamic changes and respond to the needs demanded by society to obtain social recognition of the profession. For this reason, it is fundamental to rethink the Professionalization of the Teacher, oriented to the performance of his practice and achieve the planned learning in the different educational programs; what implies a collaborative work to generate learning communities to become agents of change, capable of transforming their environment; that is, teacher professionalization programs must encourage and develop disciplinary skills as a strategy to achieve quantifiable learning objectives, ensuring a change of attitude, that show the professionalization of their teaching, reflective of their own practice and practice with other colleagues, in the improvement of teaching in a socializing context.

Teacher professionalization, Teaching practice, Professionalization program

Cultura Innovadora con TIC del Profesorado en el ITC

Innovative Culture with ICT of the Teaching Staff in the ITC

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Abstract

The Institutions of Higher Education (IES) have had to rethink their organizational structures and their curricular models with the most flexible methodological approaches that favor innovation and professional development of teachers, that the improvement of teaching requires creative and innovative and professional teachers who make them viable. In recent years, policies within HEIs have focused on the design of plans for the generation and acquisition of technological networks, teacher training programs, and the promotion of teachers' use of technologies; believing that these new technological resources the pedagogical change. However, this change has only fostered the need for the benefits of acquiring new competencies that improve teaching with creative and innovative ideas using Information and Communication Technologies (ICT). In this sense, it is evident that innovation requires adequate competition and organization to generate an innovative and integral culture that favors the construction of change and the general acceptance of all educational agents, to develop in a propitious context that systematizes. Innovation as part of a dominant organizational culture.

Innovative Culture, Educational Innovation, Information Technology and Communication

Análisis cuantitativo de la relación entre el perfil profesional de los alumnos y su desempeño escolar en el Centro Universitario UAEM Texcoco

Quantitative analysis of the relationship between the professional profile of the students and their school performance at the Centro Universitario UAEM Texcoco

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Abstract

Faced with the problems of desertion, low school performance and high rates of disapproval in some degree programs at the University Center UAEM Texcoco, there is a need to know quantitatively the relationship between low school performance and professional interests according to training Professional of the student. Some authors affirm that there is a relation between the needs of the work and the satisfaction of the people in their work and that a good relation can predict that it will be kept in it. Under this assumption, the relationship between the professional interests and the aptitudes that the students' manifest of themselves and the academic results achieved during their stay in the University is investigated. The study involves two undergraduate degrees in Computer Engineering and Administrative Computing. The study population includes the two most recent generations at the University. With the results obtained, vocational rehabilitation strategies will be implemented for the students who require it and thus increase the permanence on the school, promoting in them a realistic interest that allows the subjects to reach their academic goal starting from the analysis and awareness of their professional interests

Professional interests, School performance, Vocational orientation, Professional interests

6 Ingeniería y Tecnología

Propuesta de módulo didáctico plano para PLC S7-1200

Proposal of a didactic module for PLC S7-1200

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Abstract

The Universidad Tecnológica del Norte de Coahuila owns S7-1200 Programmable Logic Controllers (PLC). The PLCs do not have fixed location, which means that they have to be constantly moved around, being connected and disconnected from its terminals. This situation happens with every class, subject and educational program that has automation as part of its curriculum. This document proposes a design of a S7-1200 didactic module to be located at Robotics Lab of Heavy Workshop 1 of the University. The purpose of this project is to integrate technology systems in the class to assist in the learning process, by presenting a set of elements that will compromise the didactic module as well as the design based on aluminum profile, all this by keeping the aesthetic, functionality and taking care of the ergonomics. Also, as part of this effort, a practice manual has been drafted with the purpose of increasing the PLC programming skills of the students and a basic maintenance manual has been prepared to serve as guidance for care of the module.

PLC, S7-1200, Didactic Module

Diseño y Construcción de un Refrigerador Solar por Adsorción que Usa el par Oxido de Silicio-Agua

Design and Construction of an Adsorption Solar Refrigerator Using the Silicon Oxide-Water Pair

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Abstract

A critical problem for refrigeration and heat pumps is the use of energy. Traditional compression chillers and calorie pumps run on electricity. A solution for solar cooling, only in the state of Guanajuato the solar resource is 3.6 to 5.4 kilowatts per square meter. On the other hand, we can find in the literature the different types of solar cooling technology, a good example are the absorption systems and as well as the absorption and adsorption systems. This paper presents the operation of a cooling system by adsorption powered by solar energy, which was designed to achieve cooling, operating with the principle of adsorption and desorption, the system has no moving parts. The concept of operation is based on the fact that when it is cooled (at night) the silica oxide acts as a sponge that absorbs or adsorbs the water vapor and when it is heated during the sunny day the water vapor becomes desorbed or free.

Silica oxide, Adsorbent-adsorbate pair, Solar cooling

Análisis Termodinámico del proceso de compresión con enfriamiento y sin enfriamiento en un ciclo real de refrigeración R12 y 134a

Thermodynamic analysis of the compression process with cooling and without cooling in a real refrigeration cycle R12 and 134a

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Abstract

In this work a methodology was developed to determine the behavior of the compression process with cooling and without cooling in a real refrigeration cycle by mechanical vapor compression. The methodology developed was tested in an experimental refrigeration system installed in the Applied Thermal and Hydraulic Engineering Laboratory of the SEPIESIME-IPN. For the analysis of the compression process, the irreversibilities were evaluated for each of the components of the refrigeration system (evaporator, suction line, compressor, discharge line, condenser, liquid line and expansion valve). The theoretical analysis is based on the first and second law of thermodynamics. Comparing the compression processes with cooling and without cooling of a real refrigeration cycle, it is observed that the greatest irreversibilities occur when the compression process does not have cooling and, therefore, it has greater energy consumption than the compression process with cooling.

COP, real Cycle, T-s Diagram, Entropy, Enthalpy

Análisis del comportamiento eléctrico en un compresor recíprocante hermético monofásico a la modificación de las variables termodinámicas en la refrigeración

Analysis of the electrical behavior in a monophasic hermetic reciprocating compressor to the modification of the thermodynamic variables in the refrigeration

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Abstract

This article presents the analysis of the electrical behavior of the hermetic reciprocating compressor in single-phase power supply when the freezing temperature changes, this effect modifies all thermodynamic variables present in the refrigeration system, which is reflected in the behavior of the compressor's electrical consumption, In view of this situation, according to the Federal Electricity Commission (CFE), refrigeration systems are considered one of the largest consumers of electricity in the home and in industry. The objective of the analysis is to identify the peaks of the electrical consumption that represent a great demand in a temperature range of -10 to -20°C. The methodology consists in the thermodynamic analysis of the cooling system, applying laws of thermodynamics to obtain the variables that influences the behavior of the system, the fasor analysis and Euler will be applied to obtain the models that describe the electrical variables within an induction motor. The contribution of this work is to obtain a mathematical model of the behavior of a single-phase hermetic reciprocating compressor as a function of the freezing temperatures that may influence the decrease in the electrical consumption of system.

Hermetic compressor, Thermal variables, Electric power

Análisis transitorio del flujo tangencial en tanques horizontales con distintos deflectores

Transient analysis of the tangential flow in horizontal tanks with different deflectors

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Abstract

The transient numerical analysis of the flow generated by the tangential injection of air in a horizontal cylinder containing water, with its upper surface open to the atmosphere, is presented. The air is introduced into the tank with a nozzle and in front of it three types of deflectors are placed, namely, deflectors with circular, triangular, and bladed cross-section. The mathematical model is described with the Navier-Stokes equations in cylindrical polar coordinates in transient state; it is solved using the finite-element numerical method, through the COMSOL MULTIPHYSICS software. The results are displayed through the transient fields of velocity that are generated in the cross section of the container, which coincide with the injection of air in the container; also the behavior of the azimuth velocity along the diameter of the cylinder, for different times, is analyzed. When results in steady state of systems with triangular and bladed deflector were compared against the circular one, it was found that: a) the value of the velocity vector in the left upper part of the tank diminished 1.09 and 18.59%, respectively; (b) the maximum positive value of the azimuth velocity along the diameter of the container diminished 1.55 and 17.69%, respectively.

Tangencial Flow, Azimuth Velocity

Sistema de estacionamiento vertical automático

Automatic vertical parking system

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Abstract

Currently more than 1200 million vehicles are circulating in the world, it requires a space of at least 720 thousand hectares to park this amount of cars. It is necessary to propose solutions for the demand of parking space, especially in some cities in North America and Europe where there are rates of up to 7 vehicles for every 10 citizens. The automatic vertical parking design is a proposal of electromechanical, technological and control system of a system that allows to locate several cars in the same parking area. The proposal includes a mechanical modeling, the design of a PLC and computer control system that efficiently uses the motive system, includes an intuitive graphic interface, easy to operate for the user with a wireless connection to reduce the need for wiring and a system of vision to increase the security of car protection. For the operation and control tests, a prototype is made at project scale.

System, Parking, Automatic

Análisis energético de un sistema de generación termoeléctrica utilizando calor residual de celdas de combustible

Energy analysis of a thermoelectric generation system using waste heat from fuel cells

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Abstract

Increase in the price of fuels and the negative impact on the planet that implies its consumption and procurement, have promoted research in alternative technologies such as hybrid vehicles and vehicles that employ fuel cells. Fuel cells are electrochemical devices that by injection of hydrogen produce electric power, water and heat, but for industry automotive applications only the electric power is used. In this paper a proposal to take advantage of residual heat generated by the fuel cell is presented, with object from improve the efficiency of it through a cogeneration system that uses thermoelectrics. A thermoelectric is a device that from the Seebeck effect takes advantage of a gradient temperature to generate a differential potential. In the study an energy analysis is carried out where different working conditions for thermoelectric generation devices are evaluated that consider temperature gradient different (temperature on the cell and temperature with respect to the environment). As a result, an adequate arrangement of the thermoelectric devices is obtained, the power generated through heat flux between the circuit and energy efficiency associated with the whole process are calculated.

Fuel Cells, Thermoelectrics, Waste Heat

Comparación de la Degradación de la Energía en un Ciclo de Refrigeración con R-12 y R-134a

Comparison of Energy Degradation in a Refrigeration Cycle with R-12 and R-134a

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Abstract

This research describes an analysis of generated irreversibilities in a refrigeration system made by steam mechanical compression with R134a and R-12 coolings at the same thermal load. The system is now implemented in LABINTHAP laboratory in SEPI-ESIME-IPN faculty. To the analysis process is used a one minute interval capture software to record cooling temperature and pressure at the entry and exit of the evaporator, compressor, condenser and expansion valve. With the experimentally recorded information of pressure and temperature of the cooling it is calculated the variables according with enthalpy, specific volume and entropy. With the calculated variables values is made graphically cooling cycle at P-h (pressure-enthalpy) and T-s (temperature-entropy) axis. To the generated irreversibilities it was used first and second thermodynamic laws. The results of this research shown that major irreversibilities were originated in the compressor and the condenser.

COP, real Cycle, T-s Diagram, Entropy, Enthalpy

Sistema de refrigeración para unidad móvil de almacenamiento de tracto camión utilizando calor residual de los gases de combustión del motor

Refrigeration system for mobile truck storage unit using waste heat from engine combustion gases

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Abstract

The transport of perishable products is a fundamental part of the food supply chain. Among the variety of refrigerated transport means is the truck tract equipped with cold production unit that uses a steam compression system to perform this work, with a high energy consumption, which implies a high economic and environmental cost. Absorption refrigeration systems are currently considered as an ecological alternative for cooling products and building conditioning by replacing a mechanical compression component with one of thermal compression. This work presents the design, mathematical modeling and energy analysis of a refrigeration system by absorption, applied to the transport of chicken meat by a refrigerated tract truck that uses as a source of thermal energy the residual heat of engine combustion gases. The results show the thermal load associated with the cooling process, as well as the energy balances of the integrated systems.

Absorption Refrigeration, Waste Heat, Energy Analysis

Análisis del comportamiento de un eyector para aplicaciones de refrigeración utilizando CFD

Analysis of an ejector for refrigeration applications using CFD

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Abstract

One of the equipment with the highest energy consumption in any sector is the refrigeration and air conditioning systems, which are mostly steam compression systems, where the mechanical compressor is the key piece of study, either looking for a replacement to this element or adding pieces that contribute to decrease in energy consumption. An alternative is the use of ejectors, which can replace the compressor if a steam generator and a pump are also added or can be combined with the elements of the vapor compression system to reduce the energy consumption. which need to understand the behavior of these devices that allow their proper implementation, therefor in this paper an analysis of an ejector behavior is presented using CFD computational fluid dynamics. The study is carried out on a two-dimensional model and is simulated with experimental ones, the R134a refrigerant work fluid being used and the ANSYS FLUENT software is used. As a result, the pressure and velocity fields are obtained, helping to understand the phenomena that occur inside an ejector for refrigeration applications.

Ejector, Refrigeration, CFD

Diseño virtual y paramétrico de leva y seguidor

Virtual and parametric cam and follower design

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Abstract

In this paper we show the results of the application of new computational techniques, to the three-dimensional and parametric design of a plate cam system and follower with roller, that allows dynamic simulation of the system. The cam profiles are obtained based on the displacement diagram, the stroke curve and the family of circumferences that represent the roller. The links and the mechanism are designed for simulations and virtual tests of the prototype. From the displacement diagram obtained, the coordinates of the stroke curve were calculated. The equations of the circumferences that represent the roller were determined, in their different positions and sections. When solving them with their derivative, the coordinates of the inner and outer profiles of the cam were determined. With an electronic calculation sheet, the graphic files of the links and the mechanism were controlled, ensuring the friendly design. The virtual results measured coincide reasonably with those calculated ones. The described procedure can be applied in industrial and academic environments with high accuracy. By changing the input data, the graphic files are updated making possible the redesign and optimization in a relatively small time.

Design, Parameterization, System

Análisis comparativo de un sistema de ventilación forzada utilizado en un invernadero tipo baticenital considerando su colocación, Inyector – Extractor

Comparative analysis of a forced ventilation system used in a baticenital type greenhouse considering its placement, Injector - Extractor

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Abstract

The objective of this investigation is to verify in which way the placement is more effective (injector - injector, injector - extractor or extractor - extractor) of a forced ventilation system inside a greenhouse type. The greenhouse in which the research is carried out is that of the Technological University of Bahía de Banderas, which has 8 fans, 4 at one end and 4 at the other; currently the 8 are found as injectors. The internal and external monitoring of the temperature and relative humidity of the environment is carried out for several days, the internal part is monitored by means of a temperature sensor LM35 and a relative humidity sensor DHT11 which will be connected to an Arduino by means of LabView. The external variables are acquired from the meteorological station of the university "Davis". By achieving to verify which of the different combinations in the placement of the fans can be more efficient in the objective of the same, it contributes mainly in energy saving and efficiency in the reduction of temperature and relative humidity in these types of greenhouse

Extractor, Injector, Efficiency

Construcción de un prototipo de banco para el estudio de las Vibraciones Mecánicas

Construction of a bench prototype for the study of Mechanical Vibrations

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Abstract

It is important that maintenance engineers and technicians have solid knowledge of the negative effects that occur in the machines due to the excessive mechanical vibrations, this technological project is carried out by the students of the eleventh semester of Industrial Maintenance Engineering and was directed by the academic body of Technological University of Oriental, the prototype is built with a carbon steel material, a disc for counterweights of the same material and a flexible mechanical aluminum connection, driven by an electric motor of 1.5 horsepower. The objective of building a mechanical vibration bank is to facilitate the understanding of the behavior of mechanical vibrations in the mechanisms and the effects that occur in them, such as premature damage to the rolling bodies and the bases of the equipment, the prototypes will be used to give training courses on mechanical vibrations and maintenance predictive in companies besides to teaching some subjects in educational programs of TSU in Maintenance Industrial Area and in Engineering in Industrial Maintenance, like specific case machines and mechanisms and predictive maintenance.

Maintenance, Vibrations, Machines

Situación Actual de los jagüeyes del Corredor Industrial del Noreste de México

Current Status of the jagüeyes in the Industrial Corridor of North-East México

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Abstract

Tamaulipas state in México has a large amount of natural water resources, one of which are the jagüeyes, reservoirs that are characterized by being small, from 1 to 3 hectares, with the main resource being water from both pluvial precipitation and the subsurface water table. More than 80 jagüeyes have been registered throughout the state and 20 of them within Altamira's industrial corridor to the south of it. Presently, the 20 existing in Altamira show obvious changes, the likes of which have led to their being in a vulnerable state, exerting over them deterioration due to the use that the industry gives as recipients of oxidation water. For this study we sampled one of the jagüeyes known as Laguna del Conejo, which is the largest in the area and which had measured several physicochemical parameters, focusing mainly on COD that gave values between 12 to 500 mg.l⁻¹, pH between 6.82 and 8.4, conductivity between 1000 and 1650 μ S.cm⁻¹. The results obtained from COD indicate that there is a great variability of the organic matter present, high conductivity and a basic pH. This body of water is being modified by the discharges of industrial wastewater, which is also affecting the subsurface water table.

Jagüeyes, Reservoirs, Tamaulipas

Automatización de una caldera pirotubular utilizando el internet de las cosas como medida de monitoreo y seguridad

Automation of a pirotubular boiler using the internet of things as a measure of monitoring and safety

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Abstract

To have control of a process it is necessary to use a programmable control system, which must adapt to the design requirements, processing sensor signals and use this information to manage the actuators. At present this is possible but not enough since some processes require constant real time monitoring, where the user is not always present. To achieve this, a feasible option is the use of mobile applications and the internet of things that allow communication between the automated process and the user, which when implemented in the industry gives rise to the Industrial Revolution 4.0. In this new industry an interconnected system gives us the possibility of a real-time remote monitoring, providing security to the operator. Mobile applications allow to have complete remote control of systems; so what was done was a communication system of an automated pyrotubular boiler locally using a PLC and controlled remotely by means of an embedded system, a database and a mobile application that implements security warning alerts and emergency shutdown of the equipment.

Boiler, Control, Industry 4.0

Modelo bidimensional para el estudio y análisis de inundación en la ciudad de Durango, Dgo

Two-dimensional model for the study and analysis of flood in the city of Durango, Dgo

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Abstract

This article describes a two-dimensional model for the city of Durango, Dgo., Which aims to evaluate and analyze floods in that area because it is a constant problem that causes damage to the different infrastructures. For its study, a topographic analysis was carried out with the support of digital elevation models in the sub-basins located northwest of the city. Subsequently, a hydrographic analysis was carried out to determine the type of soil and the N of runoff, land use to obtain the weighted N that will be obtained with the method of runoff numbers used by the Soil Condition Service of the Department of Agriculture of the United States. And finally, a hydrological analysis with climatological stations in addition to the rain data to have monthly and annual maximums through the AFA software, which results in the different data of the return periods, through an analysis of ESIME stations and mathematical calculations. you have the hietograms And get the two-dimensional simulation and maps of tie rods and velocities that occur in the study sub-basins.

Flood, Hietograms, Sotfware

Diseño de Software para la gestión de talentos deportivos

Design of software for the management of sport talents

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Abstract

Anthropometry is one of the methods of kinanthropometry that is based on the measurements of muscular perimeters, bone diameters, skinfold, heights, lengths, weight and size, and works as a tool for sports science, medicine and nutrition, along many others. The objective of this investigation is to find anthropometric variables that are representative and common in each elite sportsmen, knowing that these must be different according to their function within training and must be kept in the teams with the best possible level. In this article, the results of the development of a Software for the Control of Sportspeople are presented, based in anthropometric results. The main tasks include the redesign of user graphic interfaces and the database. An approximation of the design of the web application via wireframes is shown too. Based on the current system with which the University of Colima (U de C) and the Colima Sports Institute (INCODE) developed in 2009, the need to implement new tools for a better performance of the athlete is born.

Anthropometry, Kinanthropometry, Sport People

Reconocimiento, Análisis y Evaluación de una Minucia en una huella dactilar Aplicando Correlación Digital de Imágenes

Recognition, Analysis and Evaluation of a Minutiae in a Fingerprint Applying Digital Image Correlation

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Abstract

Mathematical methods in time series analysis and digital image processing for understanding complex systems have been increased rapidly, especially those related to artificial vision. The digital correlation of images is an experimental technique that allows for the detection of similarity measurement based on pairwise comparisons between the pixels of the images. The digital correlation of images evaluates the pixels of an image, analyzing their rotation, deformations and displacements. The objective of this work is to develop the method and tool of a quantitative and probabilistic model of trust, for a specific minutiae of a fingerprint captured in two different moments of time. In this paper the digital correlation of two fingerprints is applied, this technique enables two fingerprints to be matched by locally comparing nucleus pairwise and calculating their correlation. Finally, the global coherency in the minutiae set is not showing on the paper, the goal is to demonstrate that the local approach has computation advantage.

Minutiae, Bifurcation, Correlation

Diseño de herramientas Web, como estrategia didáctica para alumnos con discapacidad intelectual

Web tools design, as a teaching strategy for students with intellectual disabilities

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Abstract

Today, there is a diversity of technological tools for software development and each solves one or several problems detected by society. In special education schools (CAM), they have the responsibility to assist their students with disabilities, so that they are not limited to their learning and participation, so they need help to advance their process. Learning. For this reason, you can use software tools for children with intellectual disabilities, in order to help a child at work so that the student becomes familiar with the easiest work in which they can help. money, counting on a score in each activity that was sent to the teacher of the group, generating a graph to evaluate the evolution of the student. The system was developed in PHP, using the Scrum methodology.

Tools, Software, Disability

Aplicación Móvil para la gestión, control y seguimiento de residencias profesionales, servicio social y visitas a empresas

Mobile application for the management, control and monitoring of internship, communitary service and enterprise visitings

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Abstract

Mobile applications today, have become a very important need in our society, as it allows users to access information faster and are simple to use. This has permeated the educational institutions, so that they already have mobile applications whose incorporation in education achieve significant improvements; The mobile application for management, control and monitoring of professional residences, social service and visits to companies, aims to streamline administrative activities, management and monitoring of files and procedures of students of the Technological Institute of Oaxaca, which through the Department of Technology Management and Linking links with the productive sectors, allows the integration of the student to the work activity, a tool that allows this link is the mobile application, which benefits the resident students, social service providers and teachers, allowing access to the administrative process from anywhere, generating notifications of any event or requirement of the process that is being carried out. The above results in the reduction in waiting times thus improving the service given to students; the development was based on the agile model of extreme programming.

Mobile App, Internship, Student

Evaluación de la tarjeta Raspberry Pi como herramienta en sistemas de rehabilitación motriz

Evaluation of the Raspberry Pi card as a tool in motor rehabilitation systems

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Abstract

This article presents the results of the development of a graphic interface (GI) applied to a motor rehabilitation system for hand wrist using a minimal computer system based on a Raspberry Pi 3 card. The programming of the Raspberry Pi 3 card is done in a programming language under a free software license system with the advantage of being used, modified and distributed to the programmer's needs. In addition, a comparative evaluation of the processor and hardware of the card is made and presented with respect to other devices that incorporate processors of different architecture to validate their capabilities in acquisition and signal processing too. Likewise, an inertial actuator coupled to an electronic design capable of converting physical movements to electrical signals online shown through a computer application is used at the operator's disposal, the former is performed interactively.

Microcomputer, Graphical user interfaces, Monitoring

Software Intérprete para la Interfaz Gráfica (Arduino Blocks)

Software Interpreter for the Graphic Interface (Arduino Blocks)

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Abstract

The Graphic Interface Software Interpreter, Arduino Blocks, is a web application that has a graphical, visual interface; it works as a programming tool, and works as an interpreter between user and the Arduino device, the main idea is based on a system of dragging puzzle pieces that can be assembled, this makes easier to program and processes automation, which can be applied to different areas of the different sectors, such as productive and educational. Also, Arduino Blocks can help learning process, by playing, fostering the development of knowledge and skills, offering endless possibilities, since it makes feasible the creation and development of innovative ideas without being an expert programmer. Tests were carried out with different users, and prove that the application allowed them to understand what an Arduino is, and to program devices, with Arduino Blocks you can apply code to materialize projects through communication between the interface and the Arduino through a USB port.

Arduino, Blocks, Interface, Interpreter

Algoritmo Perceptrón de Reconocimiento de Imágenes para Detección de Problemas en Cultivos de la Uva

Perceptron Algorithm of Recognition of Images for Detection of Problems in Grape Cultivation

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Abstract

At agriculture you can find damages caused by diseases, lack of water or excess of irrigation, poor pest control, among other factors. Several studies registered and classify information that allows finding solutions to such problem. We propose the implementation of an Image Recognition Perceptron Algorithm to detect problems in grape crops. This is a crop image processing system, that uses a high resolution camera in an unmanned aerial vehicle (drone), which takes images in RGB, observing tones of particular colours, wrinkles in the sheets, among other data, that helps us to establish training parameters and implement an Artificial Intelligence algorithm for recognizing images to compare them with known data and take the most convenient action. We have performed tests with a scaled Arduino prototype equipped with a camera in a grapes crop, the test showed that the sheets contained necrosis in the epidermis, a plague that produces desiccation in shoots, reducing growing.

Perceptron, Crops, Drone

Clasificación de microcalcificaciones mediante la red neuronal Inception V3

Classification of microcalcifications usign the Inception V3 neural network

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Abstract

Breast cancer is the most common cancer among women worldwide; it is the second leading cause of death in America. It is estimated that 2.8 million people are diagnosed with this disease, and 1.3 million dies from cancer each year. The best way to prevent it is its an early detection. A mammogram can yield useful data to know if the person has or not signs of cancer. There are many advances in Artificial Intelligence, specifically in the area of image recognition and classification problems. The main aim of this article is to classify mammographic images with and without microcalcifications, through the use of Inception V3 convolutional neural network, with the goal of supporting the doctor to a reliable diagnosis of this pathology. Mammographic images are used from MIAS database. The neural network was trained with original and pre-processed images. The results show better approximations in the classification when the image is pre-processed using morphological operations with a accuracy of 80%.

Breast cancer, Microcalcifications, Neural networks

Análisis hidrodinámico de turbina hidrocínética mediante CFD

Hydrodynamic analysis of hydrokinetic turbine using CFD

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Abstract

In this work a three-dimensional study is made by means of computational fluid dynamics (CFD) of a horizontal axis hydrokinetic turbine. The turbine blades have the profile Eppler-817. The analysis allows a comparison of power and torque between the BEM method and the CFD analysis under the design conditions $U = 1.5$ m/s and $TSR = 4.2$. In addition, other power results are obtained at different fluid and angular speeds with the help of CFD, in order to obtain the TSR vs C_p curves, which are useful information for the following turbine design phases. Two types of turbines are studied with two types of geometry of the blade, the first one has a flat trailing edge of 1.5 mm and the second one a pointed trailing edge. The distribution of pressures and velocities around the blades are discussed. Using a criterion based on the minimum pressures in the blade, the presence or absence of cavitation is determined.

Turbine, Hydrokinetic, CFD

Programando redes inalámbricas de sensores aplicadas al Internet de las Cosas (IoT): Un análisis sistemático

Programming wireless sensor networks to apply in the Internet of Things (IoT): systematic review

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Abstract

This article presents a state of the art systematic review about Wireless Sensor Networks applied to the interconnection of industrial or home appliances devices. This concept of interconnection among home appliances is well known as Internet of Things (IoT), also the interconnection among industrial devices is known as Industrial Internet of Things (IIoT). We present a review of the WSN-IoT characteristics such as its benefits, implementation challenges, energy issues, within others performance parameters for several protocols for WSN: WiFi, IEEE802.15.4, and Bluetooth. The main goal of this analysis is to facilitate the development of a WSN programming framework, easy to use and faster to implement IoT applications. This review will allow the proper validation of the WSN performance for IoT applications based on the Industrial or home appliances connections needs. We proposes an easy way to implement Application Programming Interface methods provided by radio transceivers in order to make it easy for the developer as long as there is no more need to be involved with lower layers of the OSI stack, and robust enough to use in an efficient way the network resources.

Development Wireless Sensor Networks, Internet of Things, APIs

Desarrollo de un sistema portátil de procesamiento y visualización de señales ultrasónicas

Development of a portable system for processing and visualization of ultrasonic signals

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Abstract

The present work consists of the technological development of a portable system for the processing and visualization of ultrasonic signals, which allows to process the captured ultrasonic signals of two piezoelectric transducers in echo pulse mode or one in dual mode. The objective of the work is to have a portable equipment of low cost and open architecture for manual inspection by ultrasound. The development of the system consists of a series of electronic modules integrated to an FPGA, allowing the control and capture of ultrasonic signals. First the FPGA sends the captured information to a Raspberry Pi 3 development card for signal processing. Then, the Discrete Fourier Transform is used to adjust the filtering frequency of the ultrasonic signal through an FIR filter. Finally, the filtered signal is displayed in A-Scan format through a screen compatible with the Raspberry Pi 3 card and this information is used for thickness measurement and fault detection. The validation of the measurement system was made using a stepped block for thickness calibration and the results obtained against a commercial team were compared.

Ultrasound, Discrete Fourier transform, Digital signal processing

Análisis de segmentación de color aplicado en una estación de verificación en una celda de manufactura

Color segmentation analysis applied in a verification station in a manufacturing cell

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Abstract

A verification within a flexible manufacturing system station is vital since this medium is responsible for inspecting parts processed by such a system, ensuring the quality of products, noting errors and allowing perform the necessary adjustments in the process. In the present work are reported the results obtained in the development and implementation of a verification station in a conveyor belt integrated into a manufacturing cell. The inspection was conducted by means of a system of processing from the image acquisition and analysis, by applying the segmentation of color. The results obtained were correlated between the Python software, Matlab and LabVIEW; and subsequently processed in Matlab, where each of the images contribute to determining the software with better intensity and resolution on the study of the color of the sample. These results suggest that there is an important similarity in intensity between images taken between Python and LabVIEW, while the images in Matlab are less noise and a lower intensity in study pixels.

Verification Station, Processing Images, Segmentation

Sistema basado en conocimiento para la predicción del clima para usos agrícolas

Knowledge Based system for predicting climate for agriculture uses

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Abstract

The results of the first phase of a project related to the development of a knowledge based system focused on the weather forecast for the agricultural sector are presented, due to the fact that weather is an important factor capable of determining the success of their activities and productions. The intention of this multi-agent system is to support said sector with taking preventive decisions, and then being able to respond to the weather changes. Just with entering the day, month, and selecting the forecast the system gives the most approximate result. Its interpretation of the results is clear and easy to visualize, showing only the required information since its graphic settings are simple. Nowadays knowing what weather there will be tomorrow or any other day is very important to develop our usual activities, since it will allow us depending on the climate, define what we can do and know how to react in a contingency situation.

Artificial/Intelligence, Predicting Climate, Expert/System

Sistema de control de velocidad de sistema de expulsión de polvo por aire aplicado en la producción de arroz

Speed control system of air dust ejection system applied in rice production

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Abstract

The article presents a system of control in closed loop of angular speed for an equipment of extraction of dust by means of air with application to a plant of production of rice. The control system consists of the application of a linear control strategy in regulation to establish the volume of extraction of particles according to the amount of dust in the air that appears during the transportation of rice in the different areas of industrial operation. A minimum computer system is used for the data-acquisition based on Arduino to control the dust extraction system. The programming of the minimum computer system is done through a programming language and an integrated open source environment. The system is designed to guarantee air quality with respect to Mexican labor health standards. The results are shown through the experimentation of a laboratory-scale prototype that can be built on an industrial scale.

Control system, Microcomputer, Monitoring

Productividad en Garantías en la Plataforma

Productivity in Guarantees on the Platform

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Abstract

The present work seeks to use efficiency, effectiveness and effectiveness to obtain productivity in the delivery of guarantees, improving the internal process. During its development, joint work was carried out with different areas of the organization. In the analysis stage, proposals were reviewed to optimize the process of updating and debugging information in the SAP system in the guarantee center, maintaining an up-to-date and functional database that would allow the delivery of spare parts to the final customer at the required time. In this process, the implementation of transactions that automate the replication of spare parts in the guarantee center was determined. As a result, the Integral Work System is implemented, which is reflected in the economies of the organization, since it contributes to the delivery of updated information in the guarantee center, in the shortest possible time and helping in the reduction of penalties for noncompliance and claim of the clients.

Productivity, Guarantees, SAP

Sistema autónomo de concentración solar asociado a un GPS para pasteurizador de leche

Autonomous system of solar concentration associated with GPS for milk pasteurizer

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Abstract

It presents a system of autonomous monitoring of two degrees of freedom associated with a Global Positioning System (GPS) coupled to a concentration lens that allows converting solar energy as a thermal application for milk pasteurization, with high pointing accuracy; the analysis of the concentration and the conditions of suitable temperature of operation is presented to obtain high temperature in an ultra-fast pasteurization process (135-140 ° during 2-10 seconds), this is achieved with the use of a concentration lens of type Fresnel coupled to a altazimuth mechanical mount designed to withstand the structural tension that keeps the system aligned to the two reference positions; the height and the solar azimuth, according to the geographical position, the date and the solar time, which are processed by a microcontroller which converts the celestial coordinates or local reference coordinates; the automatic operation of the system is carried out by means of a control module that processes the time and position variables (GPS), with a Proportional-Integral-Derivative (PID) controller; There are also measurement, control and monitoring modules that allow integrating the variables involved in the pasteurization process.

Concentrator, Solar, Pasteurization

Comparación de crecimiento de *Scenedesmus Sp.* y *Berrocodesmus Sp.* mediante la adición de CO₂ de la fermentación alcohólica

Comparison of growth of *Scenedesmus Sp* and *Berrocodesmus Sp* by the addition of CO₂ from alcoholic fermentation

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Abstract

Due to the increasing price on fuels and energy demand. Biodiesel production through microalgae is a viable alternative because their high growth rate and lipids, proteins and carbohydrates production, in a short time. Microalgae are capable of digesting CO₂ and releasing oxygen O₂ into the atmosphere. The objective of this work was to evaluate the growth of the species *Scenedesmus Sp* and *Berrocodesmus Sp*, through the optical density by spectrophotometry and dry weight. Strains were maintained in Bold Basal Medium (MBB), in a 12:12 photoperiod (light: dark) at 2500 lux, room temperature and pH 7.5. The growth reported in the Neubauer chamber in *Scenedesmus Sp* with addition of CO₂ from the fermentation was 10.00 x10⁶ cell. / mL, while MBB with addition of CO₂ from the environment was 6.15 x10⁶ cell. / mL The growth of the biomass of the strains is compared through the optical density by spectrophotometry and dry weight

Objective: To compare growth parameters *Scenedesmus Sp.* y *Berrocodesmus Sp.*, by the method of counting in Neubauer chamber and optical density biomass of recuperation (dry weight).

Methodology

- Adaptation and growth of strains *Scenedesmus Sp* y *Berrocodesmus Sp*
- Compare the growth of *Scenedesmus Sp.* y *Berrocodesmus Sp.*
- Evaluate the recuperation biomass by centrifugation and oven drying.

Microalgae, Biofuels, CO₂

Recubrimientos Ni-P negros con capa de Al y su capacidad de absorción solar

Black Ni-P with Al coating and solar absorption capacity

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Abstract

The environmental pollution and the energy crisis in the world has motivated the use of solar energy, which has two characteristics: it is clean and renewable. The objective of this work was to obtain an electroless Ni-P coating from an acid bath of nickel sulphate. Subsequently, the Ni-P coating was subjected to a process of oxidation of the surface with an acid solution with the objective of manufacturing black Ni-P whose material has been shown to have excellent solar absorbing properties. A nanometric layer of aluminum was applied by PVD in order to study the effect of this on the solar reflection capacity of the black Ni-P and to identify if it has the capacity to be used as a selective solar coating. Reflectance spectra were obtained in the electromagnetic spectrum region from 400 to 16000 nm, the spectra showed a material with a reflectance value close to 10 percent and absorbance values between 80% and 90%. The results indicate the capacity of aluminum as a selective solar coating with greater reflection capacity in the electromagnetic spectrum region of 2 to 15 μm .

Coatings, Ni-P, Solar

Evaluación Electroquímica del Extracto de Lirio Acuático como Inhibidor de Corrosión Verde para el Acero al Carbono en medios Ácidos

Electrochemical Evaluation of Aquatic Lily Extract as a Green Corrosion Inhibitor for Carbon Steel in Acid Media

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Abstract

Carbon steel is the most important steel product in the industry, which strengthens the search for methods to protect it from electrochemical corrosion. There are several methodologies to combat corrosion among them; the use of inhibiting substances is one of the most used. However, most corrosion inhibitors are usually considerable toxic chemicals due to the presence of aromatic groups. An alternative is the search for inhibitors of plant origin (green inhibitors), friendly to the environment free of toxic compounds, as well as a low cost during its production. In this work, the effect produced by the aquatic lily plant extract as a green corrosion inhibitor during the corrosion of carbon steel in medium acid (1% HCl, 5%, 10%) is evaluated through the spectroscopy technique of Impedance Electrochemistry and polarization curves. The results have found a better corrosion resistance of the steel when the extract is added, due to the formation of films of corrosion products.

Steel, Corrosion, Inhibitor

Optimización de las condiciones de tratamiento de aguas residuales de una Industria alimenticia por coagulación Química

Optimization of wastewater treatment conditions of a food Industry by Chemical coagulation

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Abstract

This project was made based on the problem that existed in a company of the food industry located in Juventino Rosas, Gto., Which has a water treatment plant, based on coagulation/flocculation, but the treatment is simple and the water treated did not meet environmental standards for discharge. The optimization of the chemical mixture for the treatment of generated wastewater was carried out, applying fractional experimental statistical designs 2^{4-1} and 2^{5-1} , the main factors being: lime ($\text{Ca}(\text{OH})_2$), sodium hypochlorite (NaClO), ferric chloride (FeCl_3) and mixing time (minutes), aluminum sulfate was also applied, applied to lots of 10 L of residual water. The response variables were turbidity, % removal and biochemical oxygen demand (BOD). These operating conditions have allowed reducing the organic matter load from 90 to 95% in batches of 1000 to 2000 L of residual water, in addition to complying with the NOM-003-SEMARNAT-1997 standard.

Coagulation, Aluminum Sulfate, BOD

Efecto fungicida de la afinina utilizado para la inhibición de los hongos *Fusarium spp.* y *Alternaria spp.*, así como la evaluación de los métodos de inoculación de estos hongos en plántula de pimiento morrón (*Capsicum annum L*)

Fungicidal effect of affinin used for the inhibition of fungi *Fusarium spp.* and *Alternaria spp.*, as well as the evaluation of the inoculation methods of these fungi in pepper seedlings (*Capsicum annum L*.)

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Abstract

The phytopathogenic fungi *Fusarium spp.* and *Alternaria spp.*, cause vascular diseases that manifest themselves in stems and leaves, causing lesions that weaken the seedling until death, diseases of great economic importance in Bell pepper and other crops. Currently they can only be controlled with chemical treatments. The objective of this study was to determine the *in vitro* inhibitory effect of ethanolic extract of Chilcuague (*Heliopsis longipes L.*) on the radial growth of fungi *Fusarium spp.* and *Alternaria spp.* in seedlings of Bell pepper. A completely randomized experimental design (DCA) was used, with treatments: 10%, 25%, 50%, 75% and 100% of extract concentration. Additionally, the periodicity of application and the method of effective inoculation were determined. Seedlings treated with vermiculite of 15 cm were used, infecting them in leaf and stem. The results show that the highest inhibition was obtained with the 25% extract concentration in applications every 24 hours, showing percentages of inhibition of 33.15% in *Alternaria* and 25.9% in *Fusarium*. The inoculation efficiency was obtained in seedlings with vermiculite for *Fusarium* with 87.36% of affected area and *Alternaria* in leaf with 73.98%. The results were analyzed in Minitab 17 software.

Inhibition, Vegetable Extract, Inoculation

Sistema de monitoreo por pozo térmico para una cava de vino subterránea

Thermal borehole monitoring system for an underground wine cellar

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Abstract

The energy consumption for climate control of wine cellars is a problem in the wine industry, due to this, 1 ton of CO₂ is emitted for each ton of wine produced. In Valle de Guadalupe, Baja California, Mexico there are 68 artisanal production wineries that, due to the use of cooling systems, increase the cost of the final product and decrease its market competitiveness. The surrounding subsoil of an underground wine cellar, represents a passive cooling system, so the objective of this work was to evaluate the oscillation in temperature at three depths of a thermal borehole and to see its effect on the optimal thermal environment for the aging of the wine. The results obtained serve as a basis to evaluate proposals for underground cellars as a bioclimatic design strategy that optimizes thermal performance and reduces the use of active systems, for the benefit of artisanal wine producers.

Thermal Well, Thermal Monitoring, Thermal Performance

Caracterización de secador solar cilíndrico: Identificación de factores principales en el secado de tortilla

Characterization of a cylindrical solar dryer: Identification of the main factors in tortilla drying

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Abstract

In the present work the characterization of a cylindrical geometry dryer and its performance in the drying of the tortilla is shown. It is well known that products such as tortillas are dried in yards and roofs with the disadvantages that they are susceptible to contamination by air and animals. In this context, as an alternative it is proposed the design of a vertical cylindrical geometry dryer that can be built with cheap materials in easy way by anybody. To optimize drying time, a set of experimental runs was designed based on a experiments design in which the categorical factors of experimentation were the time of drying, the use of semi-conical reflectors, the area/volume ratio of the dryer, the quantity of product and the use of internal ventilation. The dryer had a good performance at any time at an average temperature of 46°C, the drying of 1 kg the product in dry basis varied among in 100 and 200 minutes depending of the drying condition.

Solar Dryer, Solar Reflector, Experiments Design

Diseño y construcción de un reactor solar para remoción de benceno contenido en agua residual tratada mediante un sistema foto fenton

Design and construction of a solar reactor for removing benzene contained in residual water treated through a fenton photo system

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Abstract

At present, this work presents the design and construction of a solar reactor called Compound Parabolic Collector (CPC) where the advanced Photo Fenton oxidation process (FF) is carried out for the removal of benzene contained in the treated wastewater, which comes from of a conventional biological treatment system. When the characteristic profile of the Parabolic Compound Collector was obtained based on the acceptance angle, six channels with aluminum material were designed and constructed, in addition to a mirror finish to which a coil was attached, which was composed of 6 tubes of acrylic material. , the total volume of irradiation obtained was 6 liters. The Fenton Photo was made with the Fe²⁺ / H₂O₂ / CPC system and to quantify the removal of the Benzene, it was carried out using the Chemical Oxygen Demand (COD) parameter. The most effective treatment was 0.5 mmol / L of Fe (II) and 50 mg / L of H₂O₂ with which it obtained a removal of Benzene of 56.67%.

Solar, Reactor, Fotofenton

Síntesis y caracterización de materiales nanoestructurados de TiO₂ por el método sol gel

Synthesis and characterization of nanostructured materials of TiO₂ by the sol gel method

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Abstract

To synthesize a material that can be activated with visible light, it's an attractive idea. Several researchers have shown that this is possible through the use of TiO₂ in its anatase and rutile phases. Due to its photocatalytic properties, it is a good candidate for obtaining nanostructured materials, so the sol-gel method plays a crucial role as a synthesis method, since it could contribute to the obtaining of nanostructures, with a mixture of phases. It is for this reason that in the present work, it is intended to obtain nanostructures of TiO₂ with mixture of crystalline phases with different ratios, by means of a thermal treatment. These nanostructures have a potential application in photocatalytic degradation of organic compounds in wastewater. Titanium dioxide (TiO₂) nanostructured powders were prepared by the sol-gel method. As-synthesized materials were thermally treated at a temperature of 450 °C, in times ranging from 35 to 195 minutes. Different ratios of A-R (Anatase-Rutile) were obtained. The nanostructure powder has an approximate size of 12.8 ± 1.6 nm, obtained by UV-Vis Spectroscopy.

Anatase and rutile phase, Phase transition, Sol-Gel Method

Determinación y análisis experimental de las propiedades termofísicas de la manzana durante su proceso de cocción en una estufa solar de tipo caja

Determination and experimental analysis of the thermophysical properties of the apple during the cooking process in a solar box-type stove

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Abstract

In this work, the determination and experimental analysis of the thermophysical properties of the apple in its cooking process using a box-type solar cooker are shown. The properties determined and analyzed are density, specific heat, thermal conductivity and thermal diffusivity. To achieve the experimental process, a solar cooker, a solar simulator composed by an array of infrared lamps that generate an emission of 850 W and thermocouples placed in the apple and water are utilized. By using correlations of the specialized literature in the field of food technology, the properties are determined considering the value of the average temperature of the apple. The results achieved show values between 1068.4 - 1094.2 kg / m³, 3711.9 - 3758.7 kJ / kg ° C, 0.54 - 0.6 W / m² ° C and 1.33X10⁻⁷ - 1.5X10⁻⁷ m² / s corresponding to density, heat specific, thermal conductivity and thermal diffusivity respectively. The results obtained and the analysis carried out are of particular interest to evaluate the evolution of apple cooking by means of a solar cooker box-type, which generates a contribution to the knowledge of the studies carried out in the field of applied solar energy.

Solar Cooker, Propierties, Cooking

La Corrosión Electroquímica en la Atmosférica de la Región del Totonacapan

Electrochemical Corrosion in the Atmosphere of the Totonacapan Region

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Abstract

Carbon steel, iron, copper, zinc, aluminum and their alloys are metallurgical products of importance in the industry of any country, state or region. However, humidity, atmospheric pollution and weather conditions accelerate the corrosion of metals exposed to the weather. In the present work, the evaluation of atmospheric corrosivity was performed through the application of electrochemical resistance to polarization (R_p), Electrochemical Impedance Spectroscopy (EIE), and potentiodynamic polarization curves (CP) to zero metal specimens. , aluminum, copper and zinc exposed in the atmosphere of Papantla. The results obtained show a low resistance to corrosion in steel and zinc. Copper and aluminum form oxide films or corrosion products that provide a protective effect against corrosion. The aggressiveness of the atmosphere can be attributed to climatic conditions of high humidity and the speed and direction of the winds as well as to the selective attack produced by aggressive agents such as SO_2 , Cl^- and suspended particles.

Steel, Corrosion, Atmosphere

Evaluación energética de sistemas de enfriamiento termoeléctricos para el almacenamiento y transporte de vacunas

Energy evaluation of thermoelectric cooling systems for the storage and transport of vaccines

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Abstract

In the area of health some vaccines require to be kept under certain temperature conditions during storage and transport, thus requiring special means that fulfill this function, on the other hand, the amount of storage is not very high, which implies the use of small devices. The thermoelectric coolers are suitable for this application, since they are intended for small cooling capacities ranging from 2 to 250 watts, for this reason the application of thermoelectric cooling is proposed, which involves the use of solid state devices that convert the electrical energy in thermal energy and vice versa. This paper develops an energy evaluation of these systems for the storage and transport of vaccines, comparing different configurations of Peltier modules, having as input parameters a maximum thermal load of 70W with an internal temperature range of between 2 and 8 ° C. As a result, a map of energy behavior of the different systems is obtained, thus allowing the selection of the lowest energy consumption for such an application.

Energy Evaluation, Cooling, Thermoelectric

Desarrollo de un prototipo solar para el tratamiento de aguas residuales mediante el proceso de electro-floculación

Development of solar prototype for wastewater treatment using electro-flocculation process

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Abstract

The inexhaustible sources of energy currently offer an extensive field for the efficiency of conventional processes, in addition to being friendly to other processes of new generation such as electrochemicals. To generate an electrochemical process such as electro-flocculation, a solar prototype is developed with the quality of being sustainable from clean and inexhaustible energy, the same prototype has the quality of being able to supply energy to processes from the conventional electrical network of 127 V AC – 60 Hz. The solar prototype is capable of regulating a voltage from 1.25 V DC to 37 V DC, with a constant current of up to 1.5 A. The purpose is to induce electric current through a series of electrodes from a conductive material to wastewater for further analysis by chemical process such as COD (Chemical Oxygen Demand) and absorbance levels with the use of different laboratory instruments.

Electro-Flocculation, Electrochemical, Prototype

Aplicaciones menores de Sistemas Fotovoltaicos

Minor Applications of Photovoltaic Systems

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Abstract

Renewable energies represent nowadays the only viable alternative of sustainability in the continuous generation of energy worldwide. Going back to history, the technological evolution and the growth of societies, increasingly demanding, have made the present energies - hydrocarbons and carbon -, insufficient to supply the daily tasks of humanity. On the basis of the above, the crucial approach has emerged for regulating and conditioning the use of natural resources (present in all hierarchical levels of our society), mentioning that it is not until the year 2000 that clean energy is seriously considered as a preventive measure. The present work is dedicated to show the application of at least one of the forms of clean energy. The main contribution reported in this article will be an alternative electric power supply to the traditional one (CFE) for the operation of a distance education classroom and a solar island.

Photovoltaic, Clean Energy, Solar Island

Desarrollo de una biocelda fotovoltaica a partir de residuos verdes

Development of a photovoltaic biocell from green waste

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Abstract

A diversity of research is focused on the search for alternative sources of sustainable energy, since traditional forms of energy production have a negative impact on the environment. Photosynthesis is a very important process for the biosphere because it converts the energy of solar radiation into chemical energy that can be used by all forms of life. The purpose of this project is to generate photovoltaic energy, using the chlorophyll of *Pennisetum clandestinum* (common grass) as a photon receiver, simulating photosynthesis, using the derived electron flow to generate electrical energy. The generation of electricity from the biocell was evaluated through basic experimental statistical designs, with the voltage and current intensity as response variables. It was possible to generate a current intensity of 0.022 ± 0.008 mA and 3.85 ± 0.15 mV of energy during 10 hrs natural light phase. A pilot-scale biocell is currently being designed with an amplifier or voltage / current converter to increase the electricity generating capacity.

Biocell, Photosynthesis, Electrical Energy

Análisis para la instalación de paneles solares en el laboratorio y centro de cómputo del Instituto Tecnológico de Chihuahua II

Analysis for the installation of solar panels in the laboratory and computer center of the Instituto Tecnológico de Chihuahua II

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Abstract

In the present article the analysis that is currently carried out in the Technological Institute of Chihuahua II (ITCHII) is addressed, for an efficient use of the electrical energy by means of the installation of solar panels that supply energy to the area of the computer lab. The ITCHII establishes in its environmental policy the commitment to guide its activities of the Educational Process, towards respect for the environment and rational use of resources, through the SGA, in accordance with the ISO 14001 standard. Currently, the ITCHII is in the process of certification in the SGen in accordance with the ISO 50001 standard, to achieve sustained and continuous improvement of energy performance in the Institution. The effectiveness of the implementation of this project will be defined by the achievement of the planned results, which establish a reduction in the consumption of electricity.

Solar Panels, Electric Power, Efficiency

Dimensionamiento, instalación y puesta en marcha del Parque Solar UPAM de 50 kW de potencia

Sizing, installation and commissioning of the UPAM Solar Park with 50 kW of power

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Abstract

In the energy reform, Mexico stipulates the use of renewable energy in such a way that by 2024 the 35% of the energy generated must come from non-fossil sources, within the five most used renewable energies is solar energy, and the solar photovoltaic is more representative, that is why institutions of higher education such as the Universidad Politécnica de Amozoc are supporting to achieve the proposed objective with the use of photovoltaic systems interconnected to the Comisión Federal de Electricidad network, in this work the sizing is carried out, installation and start-up of the UPAM Solar Park, the park consists of 200 of 250W solar panels, 5 Fronius IG Plus V 10.0-3 Delta inverters, the interconnected photovoltaic system generates approximately 8.1 MWh per month, solving 60% of the energy consumption of the Universidad Politécnica de Amozoc avoiding the emission of 4.4 tons of CO₂ into the atmosphere monthly, and The return on investment is achieved in approximately 8 years.

Solar Photovoltaic, Energy, Photovoltaic Systems, Inverter

Caracterización y aprovechamiento del potencial energético renovable de afluentes hídricos de ríos y quebradas del departamento de Nariño con el fin de suministrar energía a zonas no interconectadas ZNI

Characterization and use of the renewable energy potential of rivers and creeks hydraulic affluents of the Nariño department in order to supply energy to non-interconnected zones ZNI

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Abstract

Non-interconnected ZNI zones in the department of Nariño require a local energization solution that offers a constant and reliable service and whose generation costs are accessible to the people belonging to this population group. Nariño is one of the departments that has a great potential of water resources that can be used for the generation of electricity through small hydroelectric plants. The development of a mini-hydroelectric plant for energy supply represents an alternative that can improve the living conditions of the people who inhabit these areas; besides contributing to the reduction of the environmental impact generated by other types of energies, encouraging the efficient use of these renewable resources. With the above, it is necessary to identify in the first instance a methodological model that allows identifying the energy potential of water sources such as rivers and streams that are close to these non-interconnected areas. The conditions are established to involve a pre-feasibility stage to implement a hydroelectric system with which it seeks to supply the energy demand of these communities, determining the applicability of this type of technologies and the potential that these can generate. It concludes, highlighting the importance of developing this type of technology in our region in order to transfer knowledge to the community through its dissemination.

Alternative energies, hydroelectric power, potential water characterization, Design and technological development

Potabilización de agua y generación de hidrógeno aplicando energía solar fotovoltaica

Drinking water purification and hydrogen generation using photovoltaic solar energy

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Abstract

The results of the improvement of a reactor for the production of drinking water are reported by applying photovoltaic solar energy in direct with the evaluation in the production of hydrogen. The electrochemical reactor uses aluminum electrodes and is designed in such a way that when both hydrogen and oxygen are produced from the electrolysis of the water they can be separated to have the quantification of hydrogen as well as its purity, the volume of the reactor used was 2.5 L, the workflow of 250 mL/min, and the duration of the tests was 5 hours. Likewise, melanin is used as a catalyst in order to increase the production of hydrogen. The purity of the gas is 94.6% and the main detected impurity was oxygen, nor CO₂ or CO were observed. By using melanin as a catalyst, the production of hydrogen is almost doubled without detection of other contaminating gases. In turn, the parameters obtained in the treated water (microbiological, turbidity, pH, conductivity, Cr) are within the ranges established by Mexican regulations.

Electrochemical treatment, aluminum electrodes, NOM-127-SSA

Obtención de biodiesel a partir de aceites vegetales residuales de casa habitación del fraccionamiento El Refugio, Tijuana B.C.

Obtaining biodiesel from residual vegetable oil gathered in the neighborhood El Refugio, Tijuana B. C.

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Abstract

This research is focused in realizing a study of the viability to obtain biodiesel from residual vegetable oil gathered in the neighborhood El Refugio, Tijuana B. C. As the first step established a pilot plan to gather the residual oil's, later the pretreatment was carried out to remove oil impurities which influence the obtaining the biodiesel. The physicochemical properties of the clean and dry oil were determined to verify if it could be used in production biodiesel. The acidity index was below 2%, so it was decided to use basic catalysis with a molar ratio alcohol / oil 6:1, in a concentration of catalyst of 1 % with regard to the oil and a temperature range of 30 to 60°C. Finally, the purification of the biodiesel was realized. It was determined that 978 liters per week can be collected with an efficiency in production above 90%, so it can be indicated that obtaining biofuel from residual vegetable oils is a viable alternative in a region of the country where you can not grow species for that purpose.

Oil Collection, Pretreatment and Biodiesel

Dimensionamiento y ejecución de un sistema fotovoltaico interconectado en la Universidad Tecnológica de San Juan del Río, potencia nominal: 79.20 kWp

Dimensioning and execution of a photovoltaic system interconnected at Universidad Tecnológica de San Juan del Río, nominal power: 79.20 kWp

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Abstract

It was carried out a sizing and execution of a photovoltaic system interconnected to the network in the Technological University of San Juan Del Río, Rated Power: 79.20 KWP, which has as main objective the promotion of the different types of renewable energies to be able to reduce the high Energy costs that have been presented throughout the years of operation of the university and combined with the possibility of contribution the care of the environment. The project was carried out in the building ' ' K ' ' of the aforementioned institution, which is used exclusively for professional careers laboratories: Pharmaceutical Chemistry, industrial chemistry and renewable energies. For the dimensioning of the project, different studies were carried out such as: Site studies, energy studies, as well as the elaboration of an electrical calculation memory and a performance calculation memory. These studies and calculations helped to develop the project and as preliminary direct results can be argued with solid and concise evidence that to date has seen an economic savings of approximately \$113,654.51 MN. These data can be seen reflected in the Federal Electricity Commission's payment receipts and the intelligent monitoring of the project in digital form.

Photovoltaic System, Sizing, Memory Calculation, Electrical, Performance, Costs

Obtención de biogás a partir de lodos de plantas de tratamiento de aguas residuales mediante la digestión anaerobia termofílica

Obtaining biogas from lods of wastewater treatment plants through the thermofila anaerobia digestion

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Abstract

A sludge digester was used, with an effective treatment volume of 100 L, of which the reactor worked under mono-stage thermophilic conditions (55 °C), which was fed with fresh biological sludge from a wastewater treatment plant, which was previously thickened. The thermophilic digester was operated with different feeding loads, which were the following: 0.33, 0.45, 0.55, 0.75, 1.15, 1.5 and 2.0 KgST / m³d, with respect to the production of biogas, with an average of: 6.34, 5.51, 11.00, 21.35, 31.60, 34.00 and 36.12 liters / day. The composition of the biogas showed average values of methane (CH₄): 71, 63.40, 66.20, 65, 74, 67.70, 80% respectively. It can be concluded that thermophilic anaerobic digestion constitutes an adequate option for the treatment of biological sludge and its transformation to obtain biogas with a significant production of liters / day and% of methane.

Anaerobic Digestion, Thermophilic, Sludge, Biogas, Methane

Caracterización de celda para producción de hidrogeno con fin de generar combustible alternativo para motores de combustión interna

Characterization of cell for hydrogen production in order to generate alternative fuel for internal combustion engines

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Abstract

The future shortage of fossil fuels and environmental pollution forces us to look for clean fuel alternatives. This research aims to find an efficient method for the production of hydrogen and its use as fuel in internal combustion engines. Gasoline cars do not contribute to sustainable the other hands development, instead the cars that run on hydrogen do. Therefore, the implementation of hydrogen as an alternative fuel makes it the ideal candidate due to its abundance on the planet and its explosive potential. The tests were developed using a dry hydrogen cell which was developed for experimentation of various concentrations of KOH in water with gram-to-gram variations of 1 to 20 grams to determine the optimal production of hydrogen depending on the variables involved as amperage, voltage, concentration, temperature, time. The results obtained reached a maximum point of hydrogen production with concentrations of 15 g of dissolved KOH in one gallon of water it; could be observed that higher concentrations the battery suffered premature discharges and the production did not increase considerably.

Water; Hydrogen; Electrolysis

Inclusión de tecnología sustentable y uso de energías renovables para generar energía eléctrica en el sur Tamaulipas

Inclusion of sustainable technology and use of renewable energies to generate electricity in the south of Tamaulipas

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Abstract

In Mexico, the development of sustainable technology is being promoted and investing in renewable energy production processes. In the southern region of Tamaulipas, the population is increasing at an industrial level, which implements the use of renewable energy and sustainable technology to generate electricity, the most important factors or indicators that drive the inclusion of sustainable technology and the use of Renewable energies in the study industries are: obtaining international and local environmental certifications, saving and efficient use of energy and environmental awareness. The study industries were classified by rotation: petrochemical, service and power generation. The proposed methodology is the analysis of company information from 2016 to 2018, which confirms the inclusion of sustainable technology and renewable energies in the south of Tamaulipas. The results obtained are: solar panels, combined cycle technology (Rankine and Brayton), cogeneration of energy, recovery of water vapor. It is concluded that the petrochemical sector opts for the generation of electric power as the best option and photovoltaic solar panels and service options for saving and the efficient use of energy with the implementation of equipment and the efficient machine.

Sustainable Technology, Renewable Energies, South of Tamaulipas

Diseño y construcción de un pirheliómetro para medición de radiación directa

Design and construction of a pyrhelimeter for direct radiation measurement

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Abstract

The Academic Body "Innovation and Technological Application", recognized by PRODEP as UTBB-CA-4, with level in formation, received in September 2016 the approval of an economic resource in the amount of \$ 300,000 pesos for a project called "Comprehensive evaluation of the solar resource in Nuevo Vallarta, Nayarit". Within the equipment that is required to acquire, there is an apparatus for measuring direct solar radiation called a pyrhelimeter. However, when quoted, its cost is approximately \$ 22,000 dollars, including IVA, with the solar tracker being the most expensive part with a cost of almost \$ 18,000 dollars. Due to the above, it is almost impossible to acquire it, so we are taking the task of designing and building a solar tracking system and use a Kipp & Zonnen CMP-3 pyranometer with which we already have, to build the pyrhelimeter, which We think it will cost much less money. In addition to the above, it is a commitment within this project to involve our students, so we invite 3 of them, from the engineering career in renewable energy to support us with this project and thus contribute to their training and professionalization.

Radiation, measurement, pyrhelimeter

Estudio experimental de desalación de agua de mar utilizando Energía Termosolar

Experimental study desalination of sea water using Thermosolar Energy

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Abstract

Desalination of seawater or brackish water is a proven technology for more than 50 years, which provides fresh water to millions of people living in areas of water scarcity, whether for drinking or other uses, such as hygiene and even agricultural, helping these communities not only to survive, but to achieve their economic, technological and environmental development. Unfortunately, current commercial desalination requires a large amount of energy, be it caloric or electric. Freezing desalination can theoretically achieve up to 70 % less energy use than thermal technologies, with other advantages such as that it does not need pre-treatment and low corrosion in the system. The present work shows the results obtained during the experimentation in a prototype of desalination plant of sea water by freezing, coupled to a solar cooling system, managing to increase water production for each energy unit used. It is presented an analysis of salt percent obtained in water produced.

Desalination, Solar Cooling, Energy Consumptio

Diseño e implementación de un sistema de adquisición de voltaje para celdas de combustible basadas en nopal

Design and implementation of a voltage acquisition system for nopal-based fuel cells

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Abstract

This paper presents the design, construction and implementation of a research platform for acquisition of voltage signals in fuel cells based on endemic plants of the region, specifically the nopal. For the characterization and investigation of these cells, the measurement of the voltage is fundamental to study their behavior before variables such as humidity, the size of the plant, the nutrients used and the weather conditions. The cells present low currents (micro amperes), implying a drawback for which adequate instrumentation is required, to ensure that the measured voltage in the cell is the voltage actually generated. The advantages of the platform compared to commercial systems are: the number of channels for measuring simultaneous voltages, low cost, measurement regardless of voltage polarity and communication with other interfaces to monitor voltages.

Fuel Cell, Nopal, Voltage Acquisition

Implementación metodológica para la determinación del potencial energético de un sistema fotovoltaico interconectado mediante el monitoreo de perfiles de generación eléctrica basado en series de tiempo

Methodological implementation for the determination of the energy potential of the interconnected photovoltaic system through the monitoring of electricity generation profiles based on time series

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Abstract

In this article, the profiles of electric power generation of a photovoltaic system interconnected to the electric grid are characterized. Using a proposed methodology, the historical records in periods of every 5 minutes are analyzed in order to identify relevant parameters such as, maximum power generation, energy produced, time of beginning and end of the generation cycle, quantity of clouds that pass over the photovoltaic system and the duration of the effect that the clouds have. From the determined parameters, a grouping of the profiles is carried out using the k-means technique in order to evaluate the impact of this technology promises. A comparative analysis of photovoltaic generation profiles in a historical manner is also presented in order to evaluate the potential of photovoltaic systems from generation records in small-scale systems.

Generation Profiles, Photovoltaic System, Electric Energy

Estudio para detección de defectos en Paneles Solares por medio de la Técnica de Electroluminiscencia

Study to detect Defects in Solar Panels by means of Electroluminescence

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Abstract

In the photovoltaic industry, solar cells are used as the main semiconductor material for the manufacture of solar panels, in series connection and / or in parallel to integrate the complete photovoltaic module. Solar cells can have characteristic defects such as micro cracks, broken fingers, defective contacts between cells, cells with cracks or broken cells, which are not visible to the naked eye. The electroluminescence test in the photovoltaic industry provides information on the defects found in solar cells. The objective of this study was to identify the defects found in solar cells through the electroluminescence (EL) image. The test was performed on the panels by introducing an electrical flow through the solar cells in an electroluminescence chamber. The defects found in some cells were: cut fingers, micro cracks, cracked cells, which affected the power reduction of the photovoltaic module. It is concluded that the electroluminescence technique is a useful tool for quality assurance in the manufacture of photovoltaic modules.

Electroluminescence, Photovoltaic module, Solar cells, Fingers cut

Análisis del consumo energético a través de la medición de corriente para determinar la vida útil de la herramienta de corte de un torno usando integración numérica

Numerical integration of the energy consumption by current measurements to determine the useful life of the lathe tool

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Abstract

Energy saving study in industrial processes has become a priority for any company, energy efficiency in the industry contributes to decoupling economic growth and environmental impact. The Project aimed at improving energy efficiency for a specific industrial process. The focus of this work is to determine the useful life of the cutting tool of a multi-spindle lathe using a numerical tool. The lathe machine works with 1045 carbon steel. The article shows that the impact of current increase when the tool loses its cutting ability, and this increase the cost of each piece that the machine produce. The numerical integration tool is necessary for proper interpretation of the results, this includes the understanding of the data collection with a PLC program. Thus, determining the useful life of cutting tools the process is more efficient and may reduce the specific cutting energy. Future work will be directed to determine the optimum speed of machining.

Numerical integral, Energy expenditure, Cutting tool

Estudio de la conductividad eléctrica en nano compuestos eléctricos con nano tubos desordenados

Study of the electrical conductivity in electrical nanocomposites with disordered nanotubes

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Abstract

We study the electrical conductivity of a three-dimensional (3D) nanocomposite with incorporated random carbon nanotubes (CNT) within the system. We varied the length and radius of the nanotubes using a normal distribution (Gauss) and generated a random position of the nano tube within the system using the Monte Carlo method. The conductivity of the system is associated with the critical phenomenon of percolation in the CNT, where the interception or contact in the nano tubes creates an infinite group that is capable of transmitting the electrical conductivity. We calculate the minimum probability necessary for the transmission of conductivity, by means of the technique of global optimization in parallel that allows to study the behavior of the conductivity in nanocomposites. This approach allows us to study the details of the electrical conductivity in electrical nanocomposites, even at the level of the fluctuations of filtering in nano-scale materials in the field of engineering and conductivity in materials.

Nanocomposites, Conductivity, Percolation

Diseño de un sistema fotomecánico inteligente con dos grados de libertad para la orientación de un panel fotovoltaico que optimice la producción de energía eléctrica

Design of an intelligent photomechanical system with two degrees of freedom for the orientation of a photovoltaic panel for optimize the production of electrical energy

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Abstract

Nowadays, there is an urgent need to opt for alternative sources of energy in order to reduce the negative impact of human activities on the environment. One of these sources is the photovoltaic solar panels. Accordingly, for a solar panel to optimally produce electrical energy, it must always be oriented perpendicular to the sun. The majority of the installed panels do not have mobility and are fixed, ever oriented in a single direction, which causes that they only produce electrical energy in an optimal way during a very short period of time. There are already methodologies and devices to guide them, but they are expensive and not always available. In this sense, what is sought in this project, is to take advantage of the technology available in our place, economically, as well as a fuzzy control for the photomechanical tracker, which allows to synchronize the apparent movement of the sun and have an optimal performance without using complex or expensive resources. This project is bio-inspired in the vegetable "Helianthus Annuus" that presents heliotropism to optimize the photosynthesis (also called sunflower, and in Mexico known also as "girasol", "jáquima", "maravilla", "tlapololote", "maiz de teja or acahual").

Alternative Energies, Intellygent System, Sun Tracker

Motor trifásico de 6, 9 y 12 terminales, proceso automático de identificación

Three-phase motor with 6, 9 and 12 terminals, automatic identification process

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Abstract

In this paper, a new algorithm for identifying terminals in three-phase stators of electrical machines is introduced. The proposed algorithm allows automatic identification in 6, 9 and 12 terminal machines. The proposed method enables the identification of the groups of windings in the stator, as well as their polarity. The proposed algorithm can be implemented in low-cost hardware, which allows its use in academic centers with limited resources. For validation purposes of the proposed method, its implementation is made on an inexpensive hardware platform. The main result is the feasibility of the proposed approach as a solution in the different environments that require the identification of terminals, when using the prototype, the identification of the terminals by manual method that lasts between 10 to 15 minutes is reduced to short times of between 3 to 4 seconds, without considering the time it takes to connect the terminals to the equipment, the risks are reduced of electrical discharge to the personnel, because the prototype is isolated in a cabinet.

Three-phase asynchronous motor, Phase difference of electrical signal, Electromagnetic induction

Sistema de enfriamiento y limpieza para mejorar la eficiencia en paneles fotovoltaicos en la Zona Sur de Veracruz

Cooling and cleaning system to improve efficiency in photovoltaic panels in the southern area of Veracruz

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Abstract

The efficiency of photovoltaic panels (PF) is reduced by different factors such as temperature, dust, sand, location and angle of installation; the wind and rain clean and cool panels in a natural way, but when this is not enough the efficiency of the panels is reduced. This work presents a cooling and cleaning system (CCS) through the pumping of water for short periods of time in order to improve efficiency, this system is actuated when temperatures are reached higher than 32 °c on the surface of the PF. It should be mentioned that for the CCS experimental tests, 14 PF were used with a total power of 3500 W, irradiation and ambient temperature data for the last 4 years were analyzed to determine output power and efficiency losses due to temperature theoretically and prove the feasibility of the project. With the implementation of the cooling and cleaning system achieved a 14% improvement in efficiency compared to PF where the cooling system was not used.

Panel, Efficiency, Cooling

Control de descarga de voltaje en baterías para una máquina de retribución inversa alimentada por paneles solares

Voltage discharge control on batteries for a reverse vending machine powered by photovoltaic panels

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Abstract

In this paper, we show a simple voltage discharge control system in battery and their integration on a reverse vending machine. The voltage control is designed to not discharge the batteries and use the minimum energy to support the operation of all sensors and actuators inside the machine. Likewise, an analysis of the power consumption for each element that consumes energy is made in order to compare the individual powers for the energy saving in the battery of the vending machine system. In the graphs the comparison of the curves of loading and unloading for the best power supply with its complete block diagram of the voltage control system. We present the results obtained of discharges with the control and without the control and we describe the curves of the loading and unloading where several factors are appreciated such as the stabilization of the loading and unloading and we describe the operative machine to direct current powered by solar panels.

Voltage discharge control, Reverse vending machine, Charging and discharging estimation

Técnicas pasivas para la evaluación térmica de un concentrador solar

Passive techniques for the thermal evaluation of a solar concentrator

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Abstract

The heat of industrial process in Mexico demands a temperature between 60 and 200 ° C. A sustainable alternative to solve this heat demand is use a parabolic trough solar concentrators (CCP), where direct solar radiation is directed towards the receiver, absorbing it and converting it into heat. There are active techniques to increase the thermal efficiency of these devices, such as solar trackers, although they increase the price of their implementation. Selective coatings and turbulent flow promoters are passive techniques that also increase the thermal efficiency of a CCP but at a lower cost. However, it is necessary to determine the improvement in the efficiency of a CCP using this technique. The present work reports the theoretical thermal evaluation of a commercial CCP, analyzing the effect in the efficiency of the same, when proposing the implementation of three different geometric inserts in the receiver tube. A theoretical thermal efficiency of 57% was obtained by evaluating the CCP under factory conditions using the ASHRAE 93 standard. The efficiency of the CCP is also reported with the three proposed scenarios, demonstrating an increase in efficiency of 12% when inserted. a helical wire in the receiver tube of the CCP.

Solar collector, Passive techniques, Evaluation

Análisis exerético y termoeconómico de la Central Termoeléctrica, Villa de Reyes, operando a carga parcial

Exergetic and thermoeconomic analysis of the Villa De Reyes steam Power Plant operating on partial load

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Abstract

The exergy and thermoeconomic analysis of the 350 MW Villa de Reyes thermoelectric power plant, located in San Luis Potosí, Mexico, which uses fuel oil as fuel, is presented. The analysis is carried out at different loading regimes including those of design (25%, 50%, 75% and 100%); in order to determine if these load levels are optimal for their operation. A simulation model of the steam thermal cycle, the combustion chamber and heat transfer in the steam generator was developed, the model was validated with the known operation data and then the corresponding exergy and thermoeconomic analysis was carried out. It was determined that the operating regimes of 95.7%, 75.04% and 74.04% are the most efficient, with the maximum energy and exergy efficiencies of the cycle found of 35.5% and 29% respectively. The thermoeconomic analysis allowed determining the elements with the highest exergy costs are the home of the steam generator, the heat exchange surfaces and the losses in the condenser. It was found that the thermal steam cycle efficiency of the thermoelectric plant is $35\% \pm 1\%$, for high load rates $> 74\%$.

Exergetic Analysis, Thermoeconomics, Thermal Power Plant

Prototipo electrónico de seguimiento solar sin sensores

Electronic prototype of monitoring solar without sensors

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Abstract

The development of an electronic solar tracking prototype that optimizes the capture of solar radiation from a parabolic cylindrical concentrator is presented, without the use of photosensitive sensors to avoid conflicts with the surrounding context and that is of an accessible cost. The elements that make up the electronic system are described, as well as the solar tracking process. The characteristics of the components used in the development of the prototype are also mentioned. The design of the solar electronic follower circuit is explained, detailing each of the stages that compose it, as well as the method used to design an algorithm that performs the solar tracking function. The results of the simulations of the developed software are presented. When analyzing the data of the angles measured with the calculated ones, it could be observed that the difference was small, the permissible error is 5° so that it is at the optimal point of solar radiation, which indicates that our system satisfies the needs, plus it reduces the error by 2° . Therefore, the proposed system is functional and complies with the requirements, in addition to maintaining a low cost.

Tracking, Solar, Concentrator

Generador de energía eléctrica a través de energía limpia

Generator of electric power through clean energy

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Abstract

In this article we present the development and study of a prototype from which electrical energy is obtained. Using clean technology. The proposed prototype is a table made from wood and plastic that is used for the generation of electrical energy which comes from the deformation or mechanical stress of the piezoelectric materials placed on it. The electrical energy is stored in batteries, during the periods to which the piezoelectric materials are subjected to mechanical stress. The higher mechanical stress applied to piezoelectric materials, the greater electrical energy generated, so it is convenient to apply it in places where it is mostly traveled, such as roads and highways, shopping centers, or places where people walk in a habitual way. The main elements that make up the prototype are piezoelectric materials, an electronic circuit used to convert electrical energy from alternating current to direct current, as well as filtering, storing and regulating the generated voltage. Other materials are used for its construction, such as wire, wood, batteries and ethyl vinyl acetate. For the experimental tests is used a modular platform, NI EVIS II of National Instruments which integrates the instruments used as the oscilloscope and multimeter.

Piezoelectricos, Clean Technology, Modular Platform

Sistema de Control de Iluminación para Aulas

Lighting Control System for Classrooms

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Abstract

It is very important to manage and control the consumption of electrical energy in buildings, because this achieve the optimal energy consumption. Buildings consume 40% of the total energy worldwide. The use of artificial lighting is indispensable in our days, because it is necessary for the correct development of our daily productive activities. Lighting is the most important load in comercial buildings, aports 39% of the energy consumption in comercial buildings in United States. Therefore, a lighting control system is propoused for reduce the energy consumption of a classroom. This control system will uses an SBC (Single on Board Computer) for Turn ON/OFF the lamps depending on the itinerary of use of the classrooms. The SBC will control the lamps through an actuator who will be linked to it through a wireless network using XBEE modules. It is intended with the development of this project to reduce energy consumption by at least 7%. In addition, current fluorescent lamps will be replaced by lamps with LED technology, which will provide an additional 30% savings.

Energy Efficiency, Lighting Control, LED Lighting

Taller de drones, como una herramienta emergente del mantenimiento predictivo, caso desarrollado en la Universidad Tecnológica de Jalisco

Drone workshop, as an emerging predictive maintenance tool, case developed at the Technological University of Jalisco

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Abstract

The technological universities show their quality by means of the compatibility of their teaching methods with the needs of the productive sector, however, the competences that the graduated students acquire are not always realized due to the constant changes in the technologies. Faced with this problem, the present work has the purpose of increasing the capabilities and positioning of the University through a drone workshop as an emerging predictive maintenance tool. The objective of the research was to evaluate a program of development of predictive maintenance applications with drones to compare professional competencies, brand positioning and sense of belonging to the University. The methodology consists of bringing together a group of members of the University community (29 students and 3 teachers), identifying the initial status for each one of them and applying a balanced scorecard (BSC for its acronym in English) during the 4 phases of the Program; where the first phase seeks the development of human capital, in the second an application development approach predictive maintenance, in the third a development of research and brand positioning work, and finally a final product; Once the program was completed, an evaluation was carried out that allowed comparing the effectiveness of the program, resulting in a greater capacity to use drone technology, an increase in the perception of quality, brand improvement and a sense of belonging of the participants towards the UTJ.

Drone, Unmanned vehicle, Predictive maintenance, Professional skills, Brand positioning

Modelo ergonómico para efficientar los procesos de producción (FASE I)

Ergonomic model to streamline production processes (PHASE I)

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Abstract

The model is a tool that will help companies to analyze, control and manage their material resources, from the entry process to their exit considering the costs of ordering, shipping, type of transport, existing inventories of raw materials and products. finished. The model will help to make efficient decision making in the departments of production control, materials, customs, shipping, finance, accounting, it is also a tool in which managers analyze different production options. This research covers topics from forecasts and inventories, to aggregate planning, production master plan, material requirements planning, distribution resource planning and Kanban. To present the methodology in a systematic way, each one of the topics will be shown independently. The model to streamline production processes will benefit all the companies in which we wish to calculate forecasts, inventories, production plans, production programs, material requirements, number of kanban and planning of production requirements. With the objective of developing an ergonomic model to streamline production processes, which will be analyzed, developed and put to the test.

Model, Processes, Production

Descomposición en modos empíricos y su aplicación en la detección de fallas en rodamientos

Empirical mode decomposition and its application in bearing fault detection

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Abstract

Corrective maintenance has the advantage of fully utilizing the life of the components, but is typically affected by prolonged shutdown times, since there is no way to schedule such maintenance. It also brings with it the risk of secondary damage and in the worst-case catastrophic failures. Currently, commercially available condition monitoring systems for wind turbines are based primarily on the vibration analysis of various rotating components, among which are the bearings. Bearing failures do not cause immediate stoppages, they develop over time to produce a critical fault therefore it is important to monitor the characteristic frequencies of bearing faults, these frequencies may be hidden in the traditional frequency spectrum. There are methods such as envelope analysis that can detect these frequencies, but have the drawback of requiring very high sampling frequencies. That is why the decomposition in empirical ways is proposed as a method of preprocessing the vibration signals so that together with traditional analysis techniques in the frequency domain it is possible to detect the common faults of the bearings. The results are validated with experimental data.

Bearings, EMD, Fault detection

Impacto del TPM en el Desempeño Operativo de las Empresas Industriales del Sur de Tamaulipas

Impact of the TPM on the Operational Performance of the Industrial Companies of the South of Tamaulipas

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Abstract

Total Productive Maintenance (TPM) is a strategy composed of a series of ordered activities that allow improvements in the competitiveness of the industrial organization or services. The Japanese Institute of Plant Maintenance (JIPM) defines the TPM as a system aimed at achieving zero accidents, zero defects and zero losses. This team has carried out an exhaustive bibliographical analysis of current information regarding this topic, finding a shortage in the academic literature in the industrial organizations in the area of Total Productive Maintenance, of the geographic zone of the south of Tamaulipas and finding abundant publications of Theoretical and empirical studies corresponding to international work, for this reason, the authors of this work will consider the completion of this study essential, which will allow knowing if the companies that apply the fundamental practices of the TPM have a direct impact on the maintenance performance. With the data obtained from the sample, it was determined that the dimensions of the TPM practices presented have a positive impact on the dependent variable Operational performance.

TPM, Operational Performance, Maintenance

Consideraciones, Precauciones y Fallas en el Proceso de la Impresión 3D, Utilizando el Modelado por Deposición Fundida (FDM)

Considerations, Precautions and Failures in the Process of 3D Printing, Using the Fused Deposition Modeling (FDM)

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Abstract

When using 3D printers it is important to know their operation and their capabilities, which will allow the user to get the most out of it. Arduous task if we take into account the number of variables involved in the printing process. At the moment the filaments are more present in the market and the most popular materials are polymers. And that is where the interest of this work is, in the quality or printing capabilities, in the process to carry out the best impressions, minimize the preparation and printing times, in the waste of supplies, as well as in the skills of the printers. This project shows some considerations, precautions and failures, which occur when using fused deposition modeling (FDM), a technology commonly known as 3D filament polymer printers. This type of printers was chosen because they are the ones with the lowest acquisition and operating cost.

FDM, 3Dprinting, Process

Mejoramiento en el proceso de decapado y electro-pulido de tubería inoxidable, un caso de estudio

Improvement in the process of pickling and electro-polishing of stainless pipe, a case study

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Abstract

In this article it explains and details the design of a system for the improvement of the processes of stripping and electro-polished for the pipeline of stainless steel, there decided the process of manufacture and integration of the system. The present case of study explains the design of a device of warming for aggressive liquids, as well as the accomplishment of a cell of electro-polished to optimize the process. The aim is to solve both principal problematic ones detected in the above mentioned processes, the first one is, the need to warm the acid used solutions and that due to the high corrosion index of these themselves becomes impossible to use conventional methods of warming, the second one is, to define relations of voltage / amperage for the different volumes and types of material of the pieces to electro-pulir. This methodology consists in obtaining the different properties and fundamental characteristics in the processes before mentioned like are: type of solution, pH, and type of material, volume of material, voltage, amperage and time necessary for every process. On having identified these characteristics one helped to realize of industrial and standardized form the process of stripping and electro-polished for pipeline.

Electro-Polishing, Process, Design

Automatización y optimización en el proceso de marcado de tubería inoxidable, un caso de estudio

Automation and optimization in the process of marking of stainless pipe, a case study

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Abstract

The present investigation shows the design, manufacture and integration of a system automated for marked with stainless pipeline, a case of study, in order to reduce times and improvement in the optimization of the process. The offer of design of the above-mentioned system of automation conforms by means of a process of electrical, pneumatic and electronic control. Where his first function will detect the piece to labelling, he will place it in a rail of rollers, allowing to a gripper of expansion to hold her, sliding it below the compress of the printer; the gripper is mounted on an arm led with a moto-reductor by means of pulleys and cable of steel, there was placed another train of rollers of exit, allowing to a pneumatic piston to raise it to place them in the table for his later packing. This automated system will be a useful tool for the reduction of times in the process of marked, meeting reflected immediately in the increase of production, carried out the analysis for a software of simulation, that allows to observe the constant improvement, giving I happen to find his point of optimization of the process.

Design, Pipe, Process

¿Cuáles son las herramientas de Lean Manufacturing más utilizadas en las empresas petroquímicas de la Zona sur de Tamaulipas?

What are the most used Lean Manufacturing tools in the petrochemical companies of the South Zone of Tamaulipas?

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Abstract

Lean Manufacturing arises in the production system Toyota, for many authors this philosophy aims to reduce waste, these tools have the focus of the identification and elimination of waste and the creation of value. The strength of this production system lies in determining it as a management system adapted to the era of global markets. In lean philosophy, "value" is defined from the customer's perspective in terms of cost, product, functions, etc. The importance of customer value is shown by the two levels of the lean approach: strategic and operational (Hines, Holweg, & Rich, 2004). The main objective of this paper is to determine which are the Lean Manufacturing tools applied at the operational level of the industrial companies of the southern zone of the state of Tamaulipas established in the industrial corridor of Altamira. This research is of the exploratory type since until now there are no registers of these data. This article concludes that less than 70% of the surveyed companies apply the Lean Manufacturing tools, and that the area of greatest application are the production departments followed by the maintenance department.

Lean, Tools, Strategic

Efecto del cambio del ángulo de los álabes de los impulsores en el flujo interior en depósitos cilíndricos

Effect of interior flow in cylindrical vessels due to change in pitch blade impellers

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Abstract

The flow behavior within a closed cylindrical chamber that is produced by a disc impellers, one of radial flow, and four of axial flow, with vertical blades inclined at an angle of + 30°, -30°, + 60° and -60°, is presented. The mathematical model is based on the equations of continuity and conservation of momentum in cylindrical polar coordinates for steady-state flow and incompressible fluid. Results are presented through the fields of the velocity vector () and the components of radial (u) and axial (w) velocities. In all cases, a constant angular velocity, the same radius/height ratio of the tank and water as a working fluid are maintained. The Reynolds number, according to the conditions of the system and the used fluid was 2.74×10^4 . When comparing the results of the radial-flow impeller and those of axial-flow (with +30°, -30°, +60° and -60° inclined-blades), against the disc impeller, it was found that: the component of the positive radial velocity (u) increased 442.68, 473.55, 416.63, 393.18, and 359.12%, respectively; and the component of the positive axial velocity (w), above the impellers, increased 371.46, 405.71, 294.54, 275.93, and 186.84%, respectively.

Radial Flow Impeller, Axial Flow Impeller, Radial Velocity, Axial Velocity

Solución de problemas mediante la aplicación de las etapas de ingeniería de métodos

Problem solution through the application of the method engineering stages

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Abstract

This publication is done as a solution to the problem that means the improvement in the productive process through a deep systematic analysis o the stages of a methods engineering program of all the operations direct and indirect having as a target apply improvements that allow develop the work on an easier way in terms of health and worker safeness, and allows that the work may be done in less time and with a minor investment by unit. The objective of the project consist on the application of the problems solution model through the stages of the methods engineering and a serie of coordinated activities, that are done in order to achieve the quality of the product, meaning this to standard and improve those operations that have influence on the customers satisfaction and the Company itself. This project contribution is to generate more strong and controlled processes through the reduction on the process variability, achieving by this a consistent and effective process with a high capacity of manufacturing, this assist to the purpose of satisfy the demand and obtain higher possible earnings of the finished product.

Improvement, Control, Standard

Efecto del mantenimiento industrial, maquinaria y equipo, mano de obra, métodos de trabajo y materia prima con respecto al nivel de Six Sigma en una Pyme: Caso bloquera medina del municipio de San Pedro Cholula, Puebla

Effect of industrial maintenance, machinery and equipment, labor, methods of work and raw materials with respect to the level of Six Sigma in an Pyme: Bloquera medina case of the municipality of San Pedro Cholula, Puebla

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Abstract

Companies look for strategies to sustain themselves and / or grow in the market, which are usually of continuous improvement such as Lean Manufacturing, Total Productive Maintenance, 5s, 7 quality tools, Kaizen, Six Sigma, among others. These tools are often used in large corporations, such as Motorola, Toyota, Ford, Intel, etc., however, it's important to mention that SMEs are adopting these tools for their development and business competitiveness, such is the case of the company " Bloquera Medina" that produces material for construction in the community of Cholula, Puebla. The one that has a local market, nevertheless, has the objective to venture into new markets as in the real estate or construction developments mainly. For the above, this article shows the case of a SMEs (Boquera M.), which presents the Six Sigma methodology for the development of the DMAIC model (Define, Measure, Analyze, Improve and Control), where the variables of matter were analyzed premium, labor, machinery and equipment, environment, work methods, which led to the elimination of waste in flows and operations, reduction of delivery time, reduction of variation in processes and increase in value in the organization.

Six Sigma, Resource Optimization, Industrial Maintenance, SMEs

Análisis del efecto del ángulo de inclinación de un secador solar en el proceso de secado de fresa

Inclination angle effect analysis of a solar dryer in the process of strawberry drying

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Abstract

Both results and the analysis of the effects generated by the modification in the inclination of a solar dryer evaluated under incident radiation conditions controlled in the laboratory are shown. The solar dryer considered is made of galvanized sheet with matte paint surface finish. Five trays with strawberry deposits are found along the drying chamber. The tests carried out were carried out using a solar simulator composed of an array of four infrared lamps with radiation emission equivalent to 850 W and which allow an experimental comparison for the considered inclination angles. The experimental tests were for inclination angles of the dryer of 5 °, 10 ° and 15 °. Strawberry slices with a total weight per tray of 10-15 grams were placed on the trays in a distributed manner. The decrements of the mass in each tray were weighted in intervals of 10 minutes for a duration of 6 hours of test. The results achieved show humidity reductions greater than 80%. It is identified that the area of greatest drying occurs near the dryer inlet and that the highest result occurs for a 10 ° inclination of the solar dryer.

Dryer, Solar, Inclination

Estudio y dimensionamiento de huerto solar para Comunidades marginadas del Estado de Tabasco

Study and sizing of solar vegetable garden for marginalized communities of the Etate of Tabasco

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Abstract

There are in Mexico and particularly in the state of Tabasco, communities with a high rate of marginalization, this is the case of the Ejido el Faisan community, which does not have basic services such as electrification, drainage, potable water, sewerage, others. The development of the human being is intimately linked with the consumption of electrical energy, which allows the production and consumption of products and services, such as food, communication, education, among others. So this work is presented as an alternative to electrify this marginalized community of the Municipality of Centla, developing the calculation memory to cover the required power of a house in the town, through a Solar Photovoltaic System, it was necessary to calculate the charges involved, energy consumed, the number of panels required, angle of inclination, as well as the number of batteries and charge controller that should be used to generate electric power, efficiently and sustainably for a rural dwelling.

Communities of high marginalization, solar orchards, photovoltaic solar energy, Panel capacity calculations, Battery banks

Modelado matemático de una planta de soldar eléctrica sustentable como estrategia didáctica

Mathematical modeling of a sustainable electric welding plant as a teaching strategy

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Abstract

The present paper aims at the mathematical modeling of a sustainable welding plant with the support of differential calculus tools, numerical methodology and SCADA simulation software. For its development it is considered the participation of engineering students of of Chemical and Computer Systems, creating an integrating project that allows fulfilling the interdisciplinary academic activities and improving the professional competences of the students. Likewise, in this research, didactic strategies can be implemented that promote the teaching and learning process centered on the student under a constructivist model. Thus, the future graduates students of the engineering careers from Tecnológico de Estudios Superiores de Jilotepec, will have a competitive professional level that will allow them to meet the technological needs of the different productive and social sectors of our country, as well as being able to access the labor field of any country of the world.

Mathematical Modeling, Professional Competences, Didactic Strategies

Herramienta Computacional para el Diseño de filtros de RF de circuito impreso

Microstrip RF filter design software

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Abstract

The design of the microwave filters requires the usage of expensive software, typically around \$20,000 USD; their features include: response of the filter, 3D modelling and, its solution. In this work, a software is presented, which was designed in order to obtain the patch dimensions of a low-cost PCB filter. The response of the filter can be: Butterworth, Bessel or Chebyshev; using LC networks, p o T. Besides, the mentioned filters are designed for low-pass, high-pass, band-pass or band-stop responses. The software calculates these networks giving the dimensions of the PCB strips. The obtained information is used in CAD-CAM tools in the implementation. The restrictions of the designed filters are: (a). UHF, L and C, bands; (b). The filter order should be seven or lower; (c). The printed circuit boards are two sided; and, (d). Only one design is supported at the same time. The filters were simulated in HFSS, which is a professional software for the high frequency simulation for three-dimensional structures. The experimental and simulation results are very similar, with a 5% deviation approximately. The presented software in this paper was developed in Microsoft Visual Studio and, it is still in progress.

Microwave filter, Printed Circuit Board, Visual Studio

Comparativa de panel solar monocristalino 0 y 20° vs policristalino 0 y 20° de inclinación en Puerto Vallarta

Comparison of solar panel monocristalino 0 and 20 ° vs policristalino 0 and 20 ° of inclination in Puerto Vallarta

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Abstract

This investigation define what is the difference of the electrical energy (KWH) presented in a comparative between solar panels of monocrystalline silicon or polycrystalline silicon, besides if the design of the property doesn't permit to do the inclination recommended for the panels, the investigation could be developed with the generation of these ones at 0° and 20°, in a coastal weather like the city of Puerto Vallarta, Jalisco. The system to measure has two different solar panels of the brand Solartec, with two models of S60-PC250 and another two of S60-MC250, connected to two microinversors of the brand APS model YC500 with a system of monitory and a data register that has been making recorderings since the 1rst of April 2017. Completing the data base of a year in 2018, we pretend to contribute with real information for the integrators of solars systems and the student society to make concrete desitions on their upcoming projects. As additional fact, the system didn't have any kind of manteinance like (cleaning of covers, micros, etc). All the information will be compared with the data registred by pyranometers installed at 40 meters up the panels, and others at the same height of these ones.

Polycrystalline Monocrystalline Efficient

Diseño y construcción de un módulo automatizado para simulación de regímenes de carga de un banco de pruebas de rendimiento electromecánico de biodiesel

Design and construction of an automated module for load regimes simulation of an electromechanical biodiesel performance test bench

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Abstract

This work presents the design and construction of a load module for a biodiesel electromechanical performance test bench. The bench consists of a diesel engine and an electric generator, both of 3hp. The machines are coupled in their shafts forming a motor-generator system, which is limited to no load tests. To increase the functionality of the bank, a 5-phase three-phase resistive load module is added, which leads the engine to load rates of 15, 22, 30, 45 and 85%, simulating the mechanical stress to which the diesel engine is subjected in normal conditions. The module has three resistors of 50 Ω per phase and a logic set of relays to change the topology of the circuit according to the load regimes of the test bench. The logic activation of the relays take place through an optically protected microcontroller dsPIC30F4011. The load module provides safety and efficiency to the biodiesel test bench, giving the possibility to observe the electromechanical parameters that describe changes in the combustion of the engine fuel due to load variations or to modifications of the calorific value of the fuel.

Diesel, Biodiesel, Electromechanical Parameters

Importancia del n-butanol y su aplicación al modelado de procesos de combustión

Importance of n-butanol and its application to modeling combustion processes

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Abstract

This research paper describes the importance of bio-fuels: neutral CO₂ balance, production and use considerations. Also, a reduced n-butanol reaction mechanism was obtained to implement it in the modeling and simulation of combustion processes. Under the hypothesis that it is possible to develop a combustion reduced mechanism from the reduction of different detailed chemical model, the methodology consisted of sensitivity analysis and steady-state approximation of the chemical species. From the above, fourteen chemical reactions are identified, as well as their corresponding reaction constants for coupling them to the reduced base mechanism (San Diego mechanism) that spans even butane and does not include this bio-fuel. This implied the introduction of only six additional chemical species to the base mechanism. Modeling comparison tests with experimental data of flame velocities and ignition times are reported, which supports and validates this mechanism of chemical reactions, with the advantage of saving computational time.

Bio-fuels, n-butanol, Reduced chemical mechanism

Desarrollo de una HMI tipo arquitectura abierta para la comunicación Ethernet con PLCs de la marca Allen Bradley

Development of an open architecture type HMI for Ethernet communication with PLCs from the trademark Allen Bradley

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Abstract

This paper presents the development of an open architecture type HMI based on a Raspberry Pi 3 development board, a touchscreen display, and a Python 2 based application. Our goal was to develop an HMI with open source, which is capable of to extract, modify, and visualize the data of the variables created in the Allen Bradley PLCs of the ControlLogix, CompactLogix, Micrologix, and SLC 500 families. First, we did the communication with TCP/IP sockets in conjunction with our communication libraries that facilitate the interaction between the PLC and the HMI. The interface was through the CIP. Later, we developed the libraries with the CIP protocol specifications, which are executed in the transport, application and user layers of the OSI reference model. Finally, the validation was done by connecting the interface with the PLCs Micrologix 1100 and ControlLogix 1756-L71 by reading and writing 16 different variables for each PLC. This work will allow a future the development of HMIs that will enable communication with various industrial equipment and other devices under the 4.0 industry concept in the open architecture environment.

PLC, HMI, Raspberry

Diagnóstico energético de primer nivel en la industria de fabricación de materiales para la construcción

First level energy diagnosis in the industry of manufacture of materials for the construction

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Abstract

A first level energy diagnosis was carried out in an industry dedicated to the crushing of hard stone for the production of gravel, stone dust, granulation and gravel. The objective was to know the equipment used, consumption-energy uses, electrical parameters, as well as opportunities for energy efficiency and short-term economic savings. As part of the diagnosis, the electric bill was analyzed to determine the energy consumption, power demands, power factor and costs associated with energy. Likewise, a load survey of the various motors found in the plant and measurements of the electrical parameters were made by means of an AEMC power pad 3945-B power analyzer in each substation to monitor the operating conditions. The development of the diagnosis contributes to know the energy consuming equipment, operation and electrical parameters of the substations with the purpose of proposing opportunities of energy saving, energy efficiency and short-term economic savings in the costs for electric power.

Diagnosis, Energy, Savings

Diseño de una superficie cuadrada como concentrador solar de revolución de forma libre tipo fresnel impreso en 3D

Design of a square surface as a solar concentrator of fresnel type revolution printed in 3D

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Abstract

A Fresnel-type solar concentrator of revolution was developed, starting from a free-form surface, making a 3D impression with a square design. A concave surface was used by gravity, to define the coordinates of the contour and apply the Lagrange polynomial adjustment method, to obtain the function that describes the concave surface. With this function it was possible to generate the ray traces to observe the behavior of the rays that affect and reflect and in this way to know the effective focal distance of the concentrator. This type of surfaces presents diverse applications, which can benefit society, because it can be used and used in: solar stoves, water heaters, Stirling motors, steam generators, in photovoltaic systems, etc. This development helps not emit large amounts of carbon dioxide into the atmosphere, and take advantage of clean energy from the sun, under controlled conditions it is possible to obtain temperatures ranging between (300 - 500 ° C).

Concentrator, Surface, Revolution

Caracterización y monitoreo mediante WIFI de las variables físicas en sistemas solares térmicos

Characterization and monitoring by WIFI of the physical variables in solar thermal systems

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Abstract

Solar collectors use solar energy to produce thermal energy. This energy is used to heat fluids like air and water. With the use of these devices will help to satisfy the energy needs in homes and industries, without compromising the fossil fuels reserves and reduce the impact on the environment. The proposal here presented is to make use of instrumentation of solar collectors that has more efficient systems. The systems instrumented are a solar water heater vacuum tubes and a solar dehydrator of food cabinet kind. This by means of the census and processing of the information obtained from the physical variable that interact with the solar energy collector systems. Also, is obtained a record of the behavior of both systems for making decisions and the operation. This through a monitoring interface that stores and plots the data of the sensors on a digital platform that works with HTML web page that communicates with thermal systems wirelessly and using WIFI technology.

Collector Solar, Instrumentation, Monitoring

Evaluación energética de un prototipo de calentador de agua de paso en estado no permanente

Energy evaluation of a step water heater prototype in non-steady state

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Abstract

This paper presents the energy analysis of a laboratory prototype of a step water heater, designed for a flow of 11 L/min, in non-steady flow conditions. The experimental evaluation was conducted in accordance with the Mexican official standard. The prototype was built using as a basis a commercial step water heater, which was fully adapted and implemented to obtain reliable measurements of physical variables required for the evaluation, for the registration of these variables a program was developed in the Lab-View software. The evaluation was at 9, 10, 11, 12, and 13 L/min, in periods of 1 minute. The results show that the consumption of LP gas recorded remained unchanged in all cases. The maximum water temperature was 44 ° C for 9 L/min flow, with 84% efficiency and the recorded minimum was 35.5 ° C for the 13 L/min, with an efficiency of 67%, which was the lowest registered. In any case efficiency reported by the manufacturer of 87% was obtained.

Water heater, energy efficiency, Lab-View software

Controlador global de estructura variable para un robot manipulador de l grados de libertad con articulaciones rotacionales y flexible

Global variable-structure controller applied to l degree of freedom manipulators robots with rotational flexible joint

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Abstract

In this work is proposed a methodology for a global variable-structure controller (GVSC) applied to nonlinear, time-varying and underactuated systems affected by both matched and unmatched perturbations, the main idea is designed a GVSC with an integral sliding mode control coupled together with a nonlinear \mathcal{H}_∞ control. It is theoretically proven that, using the proposed controller, the trajectories of the states in the feedback loop systems are forced to stay into the sliding mode and reject the coupled perturbations by the integral sliding mode control, and the stability of feedback loop system into the switching mode and the attenuated uncoupled perturbations are done by nonlinear \mathcal{H}_∞ control. This structure is used to solve the trajectory tracking problem in the l degrees of freedom (DOF) manipulators robots with flexible and rotational joints. The performance issues of the GVSC are illustrated in simulation studies made for a three-DOF robot manipulator.

Robust control, Nonlinear systems, Manipulator robots

Continuous Twisting aplicado al modelo matemático no lineal de un generador síncrono

Continuous Twisting apply to a nonlinear mathematical model of synchronous generator

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Abstract

Electronic power systems are responsible for generating and supplying electrical power to society. It is necessary to keep suitable levels of current and voltage in order to achieve a good performance. This levels must be keep despite constant disturbances. The synchronous generator is one device in charge of providing power to the system. In this paper we apply the Continuous Twisting Control Algorithm to provide power at a constant frequency giving robustness to the synchronous generator robustness (insensitivity to parameter variations and disturbances and modeling errors) minimizing chattering. We take the control signal, time response and error magnitudes to verify the performance of the system. Besides, we use a normal form for the mathematical model of eigh states. Results show a correct performance of the proposed control verifying disturbances in mechanical torque and short circuit. The control signal si coninuous therefore we get a reduccion of chattering.

Sincronous Generator, Twisting, Continuous Twisting

Desarrollo de una aplicación para el monitoreo del nivel de un fluido, utilizando un teléfono celular, comunicación Bluetooth y plataforma Arduino

Development of an application for monitoring the level of a fluid, using a cell phone, Bluetooth communication and Arduino platform

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Abstract

The measurements of fluid height level in different situations such as in cisterns, tanks or wastewater tanks, are important but involve difficulties and precautions taken by the user to avoid possible falls or inhale toxic vapors; the present project has the purpose of measuring the height level of the fluid using an ultrasonic sensor, also integrating the Arduino Mega platform as an information processing and monitoring system, as well as a Bluetooth wireless communication circuit, in order to transmit the information obtained to a smartphone type cell phone, agile safe and reliable. The tangible benefits of the project, in addition to the security it will offer the user, are the economic ones, based on low cost components compared to the products of industrial brands. Finally, this project can be integrated as part of others related to renewable energies and industrial processes, which require measurements of the level of various liquids.

Arduino Mega, Bluetooth, Ultrasonic

Diseñar e implementar un algoritmo de control para el seguimiento solar de un módulo fotovoltaico

Design and implement a solar tracker control algorithm for a photovoltaic module

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Abstract

This paper presents the design of two control algorithms, for a one-axis and a two-axis solar tracker. The solar position with a time correction through the Yallop's algorithm is estimated, in order to define the turn's freedom of the trackers. The mathematical model of the position's system and the mechanical structure of the solar trackers are obtained and two PID controllers are designed through the second tuning method of Ziegler-Nichols. The PID controllers designed are implemented in a microcontroller. This has a visualization stage, power stage, actuators and power and position sensors to close a control loop. The results that are obtained show that it is possible to maintain the output power of a photovoltaic module between a desired range when a solar tracker control algorithm is implemented.

Solar Position, Mathematical Model, Controller

Análisis Eléctrico y Mecánico de un Biopolímero Natural

Electrical and Mechanical Analysis of a Natural Biopolymer

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Abstract

This work presents the formulation of a polymer based on biodegradable materials. The polymer formulation consists on the selection of appropriate percentages of the combination of starches of natural origin, plasticizers and waste of fruits, such as pineapple, orange, chilacayote, guava, lemon, mango, apple, pineapple, watermelon and banana. The resulting polymer characteristics are studied in mechanical and electrical analysis. The test probes of the polymer are films, molds and test wires. The conducted experimentation includes the doping and electropolymerizing processes with different compounds and different electrical parameters respectively. The changes in the two processes aim to modify the physical and electrical intrinsic properties of the polymer. The test molds are used accordingly to the ASTM standard that provides the guidelines for mechanical tests. The resistance measurements are performed on the polymer wire to determine its resistivity. The electrical and electronic instrumentation is developed to perform an electropolymerization process by a pulsed power supply that provides variable electrical parameters at the output, namely voltage (1-24V), current (1-3A), frequency (10-1000Hz) and pulse widths (10-100 μ s).

Biopolymers, Doped, Characterization

Medición de emisiones contaminantes de vehículos con motor a gasolina, empleando prueba estática

Measurement of polluting emissions of vehicles with gasoline engines, using static test

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Abstract

The pollutant emissions of vehicles with gasoline engine are analyzed, carrying out a verification of polluting emissions with static test, which allows knowing the chemical composition of five combustion gases coming from the exhaust of cars: CO, CO, NO_x and unburned hydrocarbons (HC) as well as excess oxygen (O₂). Random tests of emissions of polluting gases of private vehicles will be carried out, taking as sample the vehicles that move to the facilities of the UAEM Nezahualcóyotl University Center. The results will be analyzed based on the criteria established in the pollutant emission standards established for the circulation of light automotive vehicles (NOM-041-SEMARNAT-2015, NOM 042-SEMARNAT-2003 and NOM-EM-167- SEMARNAT-2016). As a result of the investigation, the polluting emissions from car exhaust were measured, the relationship between the type of pollutant found, the possible causes or failures in the emission control systems of gasoline vehicles was established. The preventive maintenance strategies.

Measurement, Emissions, Gasoline Engine, Gasoline

Determinación de los KG- CO₂/ M² de un pavimento de concreto hidráulico

Determination of the KG-CO₂ / M² of a hydraulic concrete pavement

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Abstract

One way to pollute today is through the construction of works, according to Anink, D., Boonstra, C., and Mak, (1996) the construction sector is responsible for 50% of the natural resources used, 40% of the energy consumed (including energy in use) and 50% of the total waste generated. Several studies related to GHG contamination that occur in the life cycles of construction materials have been carried out in relation to this sector, and research has also been carried out on the pollution in KG-CO₂ / M², per year produced by the social interest housing in its life cycle. The objective of this work is to investigate the CO₂ / M² contamination of the construction of the hydraulic concrete pavement of a fractionation in Sonora using the "Emissions Inventory" method with standard CO₂ emission factors of each material, of the and volumes total works. The result obtained with the established criteria was that 84.77 kG-CO₂ / M² are produced in the construction, which allows us to contribute in an area of construction that is little explored in pollution through the construction of urban roads.

Efficiency, Energy, Housing, CO₂, Materials

Implementación del uso de agua condensada de los aires acondicionados en el desarrollo de las prácticas de laboratorio de química del Instituto Tecnológico de Cancún como una alternativa en el consumo de agua destilada

Implementation of the use of condensed water from air conditioners in the development of chemical laboratory practices at the Instituto Tecnológico de Cancún as an alternative in the consumption of distilled water

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Abstract

Use and collection of condensed water from air conditioners in the ITCancún laboratories that generate a large amount of this water. The ITCancún chemistry laboratory generates more than 15 liters per day of its air conditioners and the same amount is produced by the Electromechanical Engineering workshop. These impressive amounts can be attributed to the climatic conditions of the state due to the high humidity index. The purpose of this Article is to use the water collected from the air conditioning systems of the ITCancún laboratories, in the cleaning of the chemistry laboratory material and in the preparation of solutions for the development of the chemistry practices of the careers of the institute's engineering. The collection of water represents a significant economic saving in the acquisition of distilled water. The results obtained from the physicochemical parameters of the water collected from the air conditioning are pH 8.3, Alkalinity of 2.8 mg / L, conductivity 16 μ S, and 22 μ S, these parameters being water quality. Said water by condensation can be reused in cleaning floors, bathrooms. Having a comprehensive and sustainable project friendly with water care

Sustainable, Integral, Reused, Condensed Water

Evaluación de la efectividad de la técnica de bioaumentación en sedimentos contaminados con hidrocarburos de una estación de servicio de combustibles del municipio de San Francisco Putumayo Colombia

Evaluation of the effectiveness of the technique of bioaumentation in sediments contaminated with hydrocarbons of a combustibles service station of the municipality of San Francisco Putumayo Colombia

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Abstract

The present investigation evaluated the effect of the technique of biostimulation of sediments contaminated with hydrocarbons in a service station of San Francisco Putumayo, these sediments are product of maintenance and cleaning of the operation site or island, as it is, the grease trap, channels perimeter of the fuel distribution and sale zone, perimeter channels of the filling area of fuel storage tanks and vehicle washing desander. For the development of this research, in the technique of bioaugmentation was added to the sediments of the service station, solid organic fertilizers (vermicompost and bocashi) and liquid (pantothenate), the objective of the investigation was the evaluation of degradation of total hydrocarbons (TPH), contained in sediments of grease traps, through the technique of bioaugmentation. The experimental design used was an unrestricted randomization (DIA), with three treatments and three repetitions of each, the T1 treatment was natural attenuation, the T2 was applied organic manure humus worm, the T3 treatment was applied organic fertilizer bocashi plus pantothenate to T2 and T3

Biostimulation, Hydrocarbons, Fertilizers

Caracterización de especie de *Cyphomandra betacea* Cav. en la comunidad de Mazahuacán, Lolotla, Hidalgo

Characterization of species of *Cyphomandra betacea* Cav. in the community of Mazahuacán, Lolotla, Hidalgo

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Abstract

The information presented is intended to contribute to the conservation of *Cyphomandra betacea* Cav., One of many organisms that belong to the Mesophilous Mountain Forest; This work implies the knowledge its distribution and state of health of the species; To achieve this, a tour of the entire community of Mazahuacán, belonging to the municipality of Lolotla in Hidalgo, it was chosen because people are already beginning their commercialization, finding a great acceptance in the market as a natural therapeutic, thanks to its nutritional properties, so to increase its distribution and cultivation within the same space where it lives without altering its habitat, is a way to sustainably conserve the Mesophilous Mountain Forest. Being a plant of Andean origin, it likes the humidity and spaces with light, but having low temperatures at least during the night, if it was direct light it dries the leaf making it vulnerable to multiple opportunists, from insects that eat leaves, even fungi due to the great humidity that presents; The shade of trees and the warm temperatures are the best conditions to grow the plant healthy, since the direct light dehydrates the plant because of the increase of the evapotranspiration due to the size of the leaves, the distribution reflected in the present summary, is a Attempt to increase its cultivation in the community of Mazahuacán, starting with knowing where it is currently and the conditions that favor it in its growth.

***Cyphomandra betacea*, Mesophilous Mountain Forest, Mazahuacán, distribution, Lolotla**

Caracterización de Residuos Sólidos Urbanos en el municipio de Altamira, Tamaulipas

Characterization of Municipal Solid Waste in Altamira, Tamaulipas

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Abstract

The municipal solid waste (MSW) is the waste generated in the houses by the daily consumption of the habitants; they constitute an environmental and social problem, and they are proportional to the demographic growth. Every day the demographic figures are growing, with this the rate of generation of MSW increases in spite of the efforts to the regulation in topic of MSW for the Mexican government. Therefore, it is necessary to find urgent solutions that avoid the lack of control caused by excessive and unmeasured generation of the MSW. A characterization of the MSW, first that stratifies the population, sampling is carried out in the households, a collection methodology is carried out, the separation is carried out from the generation, the results are obtained and finally the statistical treatment is elaborated, representative and significant. With the results obtained, municipalities will be helped to take decisions to carry out their responsibilities in the field of MSW, taking advantage of resources efficiently. With the characterization of the MSW, per capita generation and composition are obtained in ten categories: cardboard, other consumibles, food waste, garden waste, inert waste, metal, paper, plastics, special waste and glass.

Characterization, Municipal solid waste, Sustainable Development

Análisis para la construcción de vivienda de bajos ingresos con ladrillos de plástico reciclado sin impacto ambiental negativo propuesta para Tijuana, B.C

Analysis for the construction of low cost housing with recycled plastic bricks with no negative environmental impact proposed for Tijuana, B.C

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Abstract

In the city of Tijuana, there is inefficient planning and settlements, due to strong migratory currents coming from the interior region of the country (Corona, 2018). Citizens buy social interest houses and acquire mortgages of up to 30 years or carry out self-construction without a proper planning. In Colombia, the possibility of building with recycled plastic bricks is possible. Being the plastic one of the main polluters in the world, the creator and director of the construction system project Brickarp, Fernando Llanos, explains that the degradation time of this material is an advantage for this brick, composed of polypropylene, polyethylene and plastic. The construction with recycled plastic, is an ecological housing construction method with a lifetime up of 500 years according to Fernando Llanos and being a material rescued from landfills and oceans that also has no negative environmental impact in its fabrication. This document analyzes the viability of the use of this alternative construction system for the construction of inexpensive and accessible housing in Tijuana, considering the environmental factors and the needs of the population, and the analysis of the potential use of the PET material that is recycled in the region.

Plastic Recycling, Ecological, Low Cost

Desarrollo de un Sitio Web mediante XP Xtreme Programming, para la integración de Producción Académica en área de investigación

Development of a Website through XP Xtreme Programming, for the Integration of Academic Production in the research area

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Abstract

The present work describes the process of a Web site for the administration of the information, of a Superior institution, the objective is that the research area has a website that allows to have the management of its CA Academic Bodies, in the scientific production conducted by the professors of each CA of the institution, classifying, articles, papers, books and reports of scientific research projects, made by teachers-researchers with a profile of the Program for Professional Development Teacher (PRODEP). The methodology used is the XP methodology (Xtreme Programming) is an agile methodology that allows to have the desired results, showing the functionality of the product in each phase of the development, it is carried out in four stages: Planning, Design, Coding and Testing. Software prototypes must be based on user stories, in this case teachers and public with Internet access, these stories are established from the beginning of the project. The development of this website will allow the university community to provide a support tool for the research of scientific articles of interest in institutional web pages, as well as to control and store all the scientific products that the institution has.

Academic Groups, Methodology XP, Web Site

Metodología para Desarrollo de Software Propio de la UPFIM

Methodology for the UPFIM own software development

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Abstract

In the Computer System Engineering (CSE) of the Universidad Politécnica de Francisco I. Madero (UPFIM), it is necessary to define a methodology for its own software development that allows to manage the progress in an appropriate way, to have the control over the future maintenance and creation of different versions of it; Teachers of the CSE Full Time Teacher category (FTT) and some Professors by Subject (PS) work on software development projects useful for some areas and departments of the UPFIM, because there is not enough budget to hire external the development of software or acquire it, however the automation of several processes is necessary. The methodology created has 4 stages: conception, production, growth and delivery. Each one of them has defined activities that can be carried out in parallel, the other is necessary to work them linearly, it can be considered semi-incremental since some activities and / or stages can be worked like this.

Methodology for software Development, Agile methodology, Own software

Aprendizaje basado en problemas como estrategia para la enseñanza del movimiento parabólico de partículas

Problem-based learning as a strategy for teaching parabolic motion of particles

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Abstract

In this paper an application of problem-base learning to support students in the subject of parabolic motion of particles by means of a home experiment is proposed. To encourage learning in students, is used a tower-tank system with an output water flow , which can be studied in a theoretical way to analyze it using the equations for dynamics of a particle, considering a steady output flow of water, in other words, without pressure or velocity changes. Subsequently, is given to know the way in which students can represent the scaled water system tower-tank using a few materials that all students have at home: a water carafe and a glass, exemplifying as they must carry out the experiment to obtain measurements that allow estimate the speed of the water outlet. Finally, through a survey applied to the students participating in the experiment, gets his perception in the improvement of learning topic.

Problem-based learning, Parabolic motion, Practical example

Alternativa para la enseñanza de la asignatura de aire acondicionado y refrigeración

Alternative for teaching the air conditioning and refrigeration course

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Abstract

This paper describes an alternative for the teaching of the subject of air conditioning and refrigeration for the career of Electrical Mechanical Engineer of the School of Facultad de Estudios Superiores Cuautitlán. With the support of students, experimental prototypes were designed and built that allow us to appreciate the behavior of air, in terms of the variation of its temperature and humidity in a conventional air conditioning system, you can also observe the different phases of a refrigerant, as well as the temperature and pressure in a compression refrigeration system and finally, you can see how the air temperature and humidity changes when using a passive humidification and dehumidification system. The agenda includes alternatives to reduce the thermal load of the room to be heated, such as the support of thermal insulators, the use of building materials according to the climate and the use of passive air conditioning systems.

Air Conditioning, Temperature, Humidity

Diseño e implementación optomecánica con impresión en 3D

Optomechanical design and implementation with 3D printing

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Abstract

When carrying out the design and assembly of an experimental system (technological prototype), the optical engineer finds problems with the commercial availability of the optomechanical components and devices. The problem is that most of these elements are imported to Latin America or possibly for manufacturing specialized infrastructure and qualified personnel is required. In addition, existing designs are limited and the cost and time often delay implementation. Recently, in optomechanics, the possibility has arisen of designing, manufacturing and producing three-dimensional objects at a low cost from a CAD software and a 3D printer. Among the benefits found, it stands out that accelerates the process of implementation of an experimental system, has greater freedom in the design with respect to the commercial optical mounts, allows visualized scenarios of the mounts before being manufactured. In the same way there are disadvantages, because they do not have the same resistance, rigidity and life time that a metal or plastic emptied piece. In this paper we present both an analysis and an explanation of the process of design and development of various pieces that were implemented in the research laboratory.

Optical Mounts, 3D Printing, Optomechanical Design

Diseño basado en FPGA para detección de fallas y corrección en encoders ópticos

An FPGA-based design for optical encoder fault detection and correction

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Abstract

High-accuracy industrial machines such as robotic manipulators and CNC machinery are highly dependent on optical encoders for achieving precise movements. These devices generate streams of pulses as feedback to the main controller for accurate electrical motor speed or position control. Due to high electrical disturbances caused by industrial machines, these digital pulses may get lost and cause significant current spikes and therefore damage on the controller's power circuitry. Several solutions have been proposed although these have been mainly restricted to fault detection at certain motor speeds. In this work, the authors propose a simple reconfigurable solution based on finite state machines which not only detects missing encoder pulses but can also regenerate them regardless of motor speed. Results were validated on computer simulations, as well as experimental implementation. The proposed architecture will be useful for researchers seeking a simple and precise method for optical encoder fault detection and pulse correction.

Quadrature encoder, Faulty pulse sensor, Electrical motor control

Optomecatrónica de micro-procesamiento láser para fabricación de guías de onda ópticas

Optomechatronics of laser micro-processing for manufacturing of optical waveguides

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Abstract

A prototype optomechatronics system for laser engraving of multimodal optical waveguides is presented herein. This system is based on the optomechanics of micro-positioning used for the optical disk drives. The development consists of a human-machine interface, a CO₂ laser that selectively fuses the substrate, and a two-stage linear micro-positioning system. The first stage uses a servomotor setup that provides a linear displacement of 10mm when is applied a 180° rotation; the second stage is based on a galvanometer, providing a linear displacement of 2mm when varying the voltage at its terminals in a range of ±10V with an 8 bits digital to analog converter. For an optical power density of ~7.5W/mm², the results show an average waveguide width of 320µm on polymethylmethacrylate substrates and 270µm for glass substrates. These waveguides could be used in the development of photonic biosensors.

Optomechatronics, Waveguides, CO₂ laser

Auditoría energética en el sector industrial del beneficiado o cura del cacao

Energy audit in the industrial sector of the beneficiary or cure of cocoa

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Abstract

In the state of Tabasco, a first-level energy audit was carried out on a rural production company dedicated to the beneficiation or cure of cocoa, as part of the project "Design, integration and start-up of an online digital platform for energy self-diagnostics of first level in the PyME of manufacture". The objective was to analyze the processes of fermentation, drying and packaging of cocoa, the energy flows of the equipment used (Samoa and rotary type dryers, electric motors, etc.), energy consumption (electric and thermal), electrical parameters, as the opportunities of energy efficiency and short-term or immediate economic savings. The thermal system depends to a greater extent on the consumption of LP gas and a minimum use of the available solar radiation. By means of the electric and LP gas billings for the years 2016-2017, graphs of the system's energy performance were obtained. An AEMC power pad 3945-B power analyzer was used in the 45 kVA transformer to monitor the main electrical parameters resulting in: low charge factor. Therefore, based on the results obtained, the possibilities of economic savings were proposed.

Audit, Energy, Cocoa

Análisis costo beneficio en la modernización del sistema de medición en baja tensión residencial en el territorio mexicano

Cost benefit analysis in the modernization of the residential low-voltage measurement system in Mexican territory

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Abstract

The modernization of the measurement in low residential voltage has caused inconveniences to the consumers of the CFE (Comisión Federal de Electricidad). This research aims to identify advantages and disadvantages offered by the implementation of electronic meters in the Mexican territory. The electronic measurement system offers precision reliability and control of user consumption. However, electromechanical meters have up to 5% error in the measurement. A cost-benefit analysis in the modernization of the measurement was carried out considering the socioeconomic, cultural and service environment to identify the advances offered by the modern measurement system concerning the one implemented in the country. The results determined that both systems are vulnerable, due to technological progress. The electronic cards could be reprogrammed electronically without altering their physical appearance which generates that the anomalies to the system of measurement by the company of supply are not detected. On the other hand, the costs incurred for modernization by the Mexican government and the supply company may not yet be fully amortized, and the new measurement system could cease to be reliable before its obsolescence.

Modernization, Cost-Benefit, Low Voltage

Gestión de los residuos sólidos urbanos en México

Management of urban solid waste in Mexico

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Abstract

The waste generated at the global level have increased significantly with the passage of the years, this due to the level of industrialization of each country as well as by globalization, which together directly impact on consumption is done from various products that cover the basic and recreational needs. This sustained increase, implies a greater volume and diversity of composition of the solid waste generated around the world, however, in particular, the main objective of this article is to make known the management of urban solid waste in Mexico, its characterization, regulation and the necessary regulations that permit the correct management of these wastes. Also the key components to carry out an efficient management of urban solid waste, considering various actions or activities including the generation of waste, collection, transfer, the use and final disposition are described. In addition, statistics about recycling and utilization of urban solid waste are shown.

Management, Urban Solid Waste, Mexico

Customer Relationship Management Web para empresas de la construcción

Customer Relationship Management Web for construction companies

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Abstract

This article describes the process of analysis, design, production and technological implementation carried out within the framework of the academic collaboration agreement between the Universidad Tecnológica de Jalisco (UTJ) through the Research Group (RG) UTJAL-CA-2 Social Responsibility , Sustainability and Integral Development for SMEs and the Camara Mexicana de la Industria de la Construcción (CMIC). This process consisted in the implementation of the agile software development methodology SCRUM for the creation of a web application for the automation of the management of the commercial relations of the clients. This application will allow to establish the mechanisms that ensure the correct communication and collaboration in the administration of projects to be developed, allowing the customer service processes to be stored and managed by the application, as well as being accessible to all the members of the organization that have a direct or indirect relationship with the client or the projects that are being developed. This will allow to control and direct the work efforts of the collaborators towards a better management of the resources of the company and offer a better follow up to all the sales processes.

CRM, Web Development, Web Application

Generación de innovación tecnológica como alternativa para generar valor y su repercusión en la toma de decisiones en las SMES

Generation of technological innovation as an alternative to generate value and its impact on decision-making in SMES

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Abstract

PYMES Innovation PYMES, (small and medium-sized company) is a required element to survival because of markets competition. Technological innovation consists of changes and modifications in the different processes and their application. These changes, by themselves may not mean great advances in the generation of knowledge or technologies. If these changes are made permanent based on systems, implemented measurable both in individuals and procedures, will mean a permanent improvement throughout the company. One tool for the generation of PYMES innovation is information technology (IT) in the management activities of PYMES to impact decision-making and in its final performance, for which it is important to carry out a field study to know where the opportunity areas are for implementation. The main objective of this work will be to carry out a study to generate a perspective on the impact of innovation, the subsequently tools related and how it has been applied in PYMES located in the municipality of Ocotlán, Jalisco.

Technological innovation, knowledge generation, information technology

Comparativa económica- ambiental de un sistema de refrigeración alternativo con respecto a un sistema de refrigeración convencional aplicados al transporte de perecederos

Economic-environmental comparison of an alternative refrigeration system with respect to a conventional refrigeration system applied to the transport of perishables

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Abstract

The growing demand of food, which cannot always be produced where it will be consumed, has caused the increase of the perishable supply chain in recent years. Most of the transportation and distribution processes of perishable food are carried out by means of refrigerated vehicles, which use vapor compression refrigeration systems powered by a diesel engine. This type of refrigerated transport systems consumes a large amount of fuel, since the cooling system needs additional energy to extract the heat from the refrigerated box, causing an increase in the cost of transporting goods and the emission of greenhouse gases. (GHG). Due to the above, research has been carried out on alternate refrigeration systems, such as the absorption system using thermal energy, with which it could reduce operating costs and the emission of GHG from the truck tract, using waste heat from it. In the present work is carried out an economic-environmental comparison of an alternative refrigeration system with respect to a conventional system, applied to the transport of perishables. This comparison includes the calculation of GHGs and fuel costs, determining the advantages and disadvantages of each of the systems

Refrigerated transport, Energy comparative, Reduction of greenhouse gases

Generación de información de Mercado de la Industria Solar Mexicana bajo un modelo de análisis estratégico e innovación

Generation of market information of the Mexican Solar Industry under a model of strategic analysis and innovation

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Abstract

The Mexican solar industry is being born because the existing mainly serves the commercialization of imported technology. Currently initiatives have been developed that seek to create this industry in Mexico, one of them is the Mexican Center for Innovation in Solar Energy, this Center was created in 2013 where the academic and research sector was invited to propose projects that could reach the market and generate innovation, giving way to a Mexican solar industry. The progress of this project is reflected in the generation of industrial property but without really addressing market needs, this is due to the fact that there is little formal and validated information that helps to make the best decisions to the academics who are conducting this research and to the sector. productive that motivates investment in these technologies. Derived from the above, this project strategically acquires the relevance to be able to provide information to the actors that are building the nascent solar industry. An analysis of the state of the art and the technique was carried out on market information generated regarding the solar industry in a global manner. The global information was analyzed and a study framework was proposed for the Mexican solar industry.

Solar Industry, Solar Market, Suply Chain

Estudio de viabilidad económica de un sistema eólico interconectado a la red para el autoabastecimiento de la Universidad del Istmo

Economical Feasibility study of a wind system interconnected to the grid for the self-supply at the Isthmus University

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Abstract

Wind energy is one of the renewable energy sources that has experienced a constant growth worldwide. Currently, this source of energy is part of electricity markets in many countries, being China, United States and Germany the leading countries in installed capacity. In México there have been important advances and the total installed capacity already exceeds 4 GW, being the self-supply scheme one of the most used. The region of Isthmus of Tehuantepec is the main scenario for wind projects in the country, due to the great wind potential available. In this region, UNISTMO is located, an institution of higher education that has three university campuses: Tehuantepec, Ixtepec and Juchitán. This university is currently supplied with the electric power supplied by CFE, however, it has resources such as wind and solar that could be used to produce part or all of the energy consumed. For this reason, in this work the simulation, optimization and study of sensitivity of a wind system interconnected to the electric network at Campus Juchitán are carried out, considering variations in certain technical-economic variables.

Renewable energy, Electrical markets, Economical study

Implementación del despacho económico para la localización óptima de parques eólicos

Implementation of the economic dispatch to optimize the location of the wind parks

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Abstract

The supply of electrical energy must be guaranteed in a sustainable way due to the depletion of non-renewable resources, as new alternatives for renewable resources, known as clean energies. As a concrete case, for the state of Tamaulipas, previous studies have been carried out that indicate its enormous potential for the installation of the wind parks. This paper presents an analysis of the efficient management of electricity production through the generation of clean energy, such as wind energy. This analysis is carried out under the economic dispatch scheme, proposed as a problem of minimization of energy at the time of transmission. The mathematical model, formulated through a linear programming scheme and considering the real variables, allows to find the optimal location of a wind park in order to maximize the generated energy, showing the real generation capacity. The analysis realized has the advantages of being a method that yields the best solution for the linear optimization model, unlike the heuristic methods that only look for a solution that is closest to the optimum.

Economic Dispatch, Linear Programming, Optimization

Análisis económico y social de las MiPymes de Mixquiahuala de Juárez Hidalgo, una perspectiva para la generación de redes de colaboración

Economic and social analysis of the Mixquiahuala de Juárez Hidalgo MSMEs, a perspective for the generation of collaboration networks

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Abstract

The main objective of this article is to present the current situation of offline and online market of mypimes of Mixquiahuala, towards the integration of collaboration networks, the market situation was investigated regarding the thought of whether the supermarkets or wholesaler stores They have caused the business to lower their sales. We investigated whether the owners of the businesses have made an online purchase, identify their competitors. Tortillerias pollerias butchers, stationeries, bakeries, grocery stores, groceries. The methodology of quantitative research was used to apply a survey on the application of offiline and online markets. Contributes with the present article to awaken the interest and knowledge of online technologies to compete with the big companies that have wreaked havoc in the economy of the municipality.

Online and offline market, Technology, Economy

Aplicación de Business Intelligence en el proceso de toma de decisiones de una empresa de análisis clínicos

Application of Business Intelligence in the decisionmaking process of a clinical analysis company

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Abstract

Currently, Business Intelligence (BI) applies in different ways, in order to obtain knowledge of organizations based on the transactional data they have accumulated. This article presents an application of the BI tools that was developed for a clinical analysis company. This application has a dashboard that provides a support tool in the decision-making process. The dashboard includes different KPIs (Key Performance Indicators), such as (1) Studies sold by category, branch, month and year, (2) Total sales by year, month and branch, (3) Total sales of employees by branch, year and month, and, (4) Number of clinical studies requested by medical institutions. This will contribute to the aforementioned company having elements that provide knowledge on the behavior of the company, and, thus make the best decisions that lead to a successful operation. The used methodology is the PSP / TSP standard, which proposes strategies, aimed at improving the quality and productivity of software development projects and thus speed up compliance with the goals, guaranteeing customer satisfaction.

Business Intelligence, Dashboard, Decision making

Educación ambiental con ética y responsabilidad sostenible y sustentable: El caso del Instituto Tecnológico Superior de Alvarado (ITSAV)

Environmental education with ethics and sustainable and sustainable responsibility: The case of the Instituto Tecnológico Superior de Alvarado (ITSAV)

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Abstract

The present research work entitled "An Environmental Education with a Vision of Ethics and Sustainable and Sustainable Responsibility", was carried out with the purpose of promoting an environmental education from the teaching practice in subjects of Sustainable Development and Ethics Workshop, taught in all Federal and Decentralized Technology Institutes of Mexico. The subjects undoubtedly contribute an added value to the engineering profile, since through these the construction of environments with ethics and social responsibility begins, concluding that these actions limit the teaching-learning process, taking into account how Key elements for ecosystem sustainability. Therefore, the general objective is to promote environmental education for the students of the Higher Technological Institute of Alvarado (ITSAV, by its Spanish acronym) through proposals of what to teach and how to teach the sustainable and sustainable development of human-natural systems based on learning significant. In this way generate awareness in students to apply it in daily life and professional fostering sustainable and sustainable culture with a holistic vision, ethical practice and social responsibility.

Environmental education, Ethics and sustainable responsibility, Ethics and sustainable responsibility, Significant learning

Situación actual de la perspectiva de desarrollo para la microempresa del giro comercial de venta de pollo, tortillería y abarrotes del Municipio de Mixquiahuala de Juárez, Hidalgo

Current situation of the development perspective for the microenterprise of the commercial sale of chicken, tortilla shop and grocery shop in the Municipality of Mixquiahuala de Juárez, Hidalgo

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Abstract

The economic structure of Mexico is based on the development and economic growth of companies, prevailing 94.3% of economic units considered as micro enterprises according to INEGI (2015), which only contribute a tenth of the country's gross domestic production, being an analysis and discussion table to evaluate the obstacles that the micro company faces. The State of Hidalgo in recent years has become more competitive, the result of its favorable location and industrial infrastructure that has allowed to establish national projects, in such a way that a new perspective of development for the micro-enterprise of the region is opened and in particular for the Municipality of Mixquiahuala de Juárez, the study presents the current situation of the level of adoption of strategies that the commercial companies in the sale of chicken, tortillas and groceries apply to improve their positioning in the local and regional market, through an analysis descriptive and correlational factors are identified that in a certain situation affects them in the fulfillment of their goals. The main contribution of this article lies in the identification of the variable that directly affects the perspective of development being the competition, hence the need to propose marketing strategies that allow to encourage the economy of companies.

Strategies, Market, Development

Cálculo del área de transferencia de calor necesaria para un transformador de calor de una etapa

Calculus of heat transfer area necessary for a single-stage heat transformer

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Abstract

A heat transformer is proposed in the literature by Colorado [3], with the aim of being in the desalination process. However, in that study, the heat transfer area of the main components in the system has not been calculated. The present investigation provides the proposal to calculate the area of each pieces of equipment to obtain the total transfer area and contributes the construction of the entire system. A lithium bromide solution and water are proposed as an absorbent and as a refrigerant, respectively for the system. A heat transformer is estimated based on calculations of energy analysis: coefficient of performance of 0.4049, the heat load in the evaporator is 2 kW and the heat load of the generator is 1.37105 kW. Four heat exchangers assuming the tubes and shell design are proposed in this research. The surface required for each heat exchanger to transfer those heat loads is calculated through a logarithmic temperature difference method using an appropriate global heat transfer, incrustation factors and local heat transfer, according to the proposal of Jain and Sachdeva [9].

Absorption, Design, Heat exchanger

Modelado Matemático de un Controlador PID de Ganancia Variable dependiente del Punto de Consigna en la Salida de un PID Convencional

Mathematical Modeling of a Variable Gain PID Controller, Dependent of the set point in the output of a Conventional PID

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Abstract

A PID control structure was modified proposed by K. Ogata. It is proposed a structure Nonlinear PID control, implemented using analogical electronics. A mathematical model was obtained using conventional methods. It was proved the validity of the model obtained comparing against the response of the model proposed by K. Ogata. It was concluded that the proposed structure is stable.

Modeling, Nonlinear control systems, PID

Análisis comparativo de los métodos estadísticos usados para estimar los parámetros de Weibull

Comparative analysis of statistical methods for estimating Weibull parameters

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Abstract

This paper describes and compares four of the most used statistical methods of the specialized literature for estimating Weibull parameters, the scale parameter c and the form factor k , which are widely used in wind energy applications for approximating the random distribution of wind speeds for a given location. The particular characteristic of this paper is doing a comparative analysis to determine the statistical method that offers the highest precision, specifically, for several sites with high wind potential in the region of the Isthmus of Tehuantepec. To carry out this study, it is obtained, firstly, the annual wind measurements of three anemometric stations located in the municipalities of Ixtepec, Juchitan de Zaragoza and Santo Domingo Tehuantepec at the Oaxaca state. Next, a statistical analysis of the wind data in Matlab is made and the parameters c and k for the methods of Variance, Justus, Moments and Least Squares are determined. Finally, based on the percentage relative error criterion, a comparative analysis of the results obtained from each of the statistical methods studied is carried out and the most accurate method is determined for being used at the wind conditions of the Isthmus of Tehuantepec.

Weibull distribution, Statistical methods, Wind energy

Reutilización de palés para la construcción de vivienda alternativa

Reuse of wooden pallets for alternative housing construction

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Abstract

The reuse of construction materials for housing is a recurrent activity for the low resource population. Among the causes is the increase in cost of conventional construction materials (concrete block, cement and stone materials) and labor. However, reusing parts that work for purposes other than construction is feasible. Wooden pallets are pieces used in all types of industry for the transport of products and materials, which once discarded, in many cases are burned, and environmental deterioration increases by CO₂ emissions from the combustion as well as limiting the life cycle of the pieces. Therefore, their life cycle extension is proposed, by reusing the pallets as constructive elements, with the technical specifications for their use, as well as their adaptation criteria for an extreme hot dry climate. This article presents the comparisons of use for life cycle cost of walls built with wooden pallets, in comparison with walls built of conventional concrete blocks. The use of pallets for construction, with the appropriate technical considerations, is a viable proposal.

Pallets, Construction, Life cycle cost

Implementación de un Sistema de Captación de Aguas de Lluvia SCALL, como prototipo en vivienda popular utilizando energías renovables (paneles solares)

Implementation of a Water Catchment System of Rainwater (WCSR), as the prototype in popular home using renewable energy (solar panels)

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Abstract

Water is a vital resource both for plant production and the survival of living beings, this importance not only has to do with cyclical functions of water for plants and animals, but also due to its dynamic characteristics in metabolic processes, since if it is not used or stored for later use it flows out of the area of interest. All the above determines that the issue of water and its proper management is a priority for the rural and urban population of Tlajomulco de Zuñiga, where rainfalls is not enough. The objective of this work is the implementation of a Water Catchment System of Rain (WCSR) as a prototype in popular home using renewable energy (solar panels) based on System Photovoltaic SPV. The results of this study will be determination of the rain potential, as well as the annual volume of rainfall, proposing an automated prototype system for collection of rainwater at scale, essential for the lack of water and a good quality in the region valleys the Metropolitan Zone of Guadalajara (MZG).

Rainfalls, Water Catchment System of Rain, Prototype, Renewable energy, System Photovoltaic

Diseño, instrumentación y construcción de un prototipo de banco de pruebas para la utilización de gasolina-hidrógeno en motores con ciclo Otto

Design, instrumentation and construction of test bench prototype for gasoline-hydrogen mixture to use in Otto cycle motors

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Abstract

The next investigation project present the instrumentation, design and the manufacturing used for the construction of a test bench prototype, which is focus on a characterization of internal combustion engine with 4 times Otto cycle, stationary type, cooled by air ventilation, two cylinders in a 45° position with 480 cubic centimeters, velocity of 2400 revolutions per minute in neutral without load or power demand, atmospheric pressure feeding and a net power of 16 hp, using gasoline-hydrogen mixtures with the objective of the fuel consumption evaluation, the power and the energy balance required for efficient production of hydrogen for self-consumption. As results of the present project there are the design blueprints, the manufacturing process description, the physical and virtual instrumentation which are presented for the characterization of the rpm parameters, fuel consumption, power, air consumption, energy balance for the engine energy generation and the required energy for the operation of the hydrogen cell.

Otto cicle, Gasoline-hydrogen, Test bench

Implementación de un Sistema de Administración de Medicamento, con Seguridad Biométrica: Meditech

Implementation of a Medication Administration System, with Biometric Security: Meditech

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Abstract

At hospitals, the nursing staff takes control of the treatment of patients, which makes it possible to make mistakes. Talking about medicines, it can be catastrophic. We propose the implementation of Meditech, an application to keep strict control of different factors: symptoms, allergies and medications. Meditech will allow nursing staff, a wide visualization of applied medication, provide alarms for pending doses or due to expire; all in a friendly and graphical program interface, which, in case of doubt contains a security method with the biometric characteristics of the patient's fingerprint. In addition, it will take into account certain characteristics such as gender, height, complexion, age, stage and weight, this way, you will have the option to choose the medicine you want to give the patient and allergies that have been presented before. When performing various simulation tests with patient, it was observed that Meditech is feasible to implement since it worked optimally.

Biometrics, Drugs, Patients

Control de un convertidor elevador CD-CD *push-pull*

Control for converter elevator CD-CD *push-pull*

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Abstract

The cd-cd converters due to their large number of industrial applications, require controllers that provide specific characteristics to the system, such as: rapid response, stability against disturbances and efficiency in the conversion of energy, which are difficult to achieve by their own non-linear nature of the system. In this work a mathematical model is proposed for the push-pull cd-cd converter, which is obtained from applying the state averaging technique. The resulting model is expressed in dynamic equations, transfer function and state spaces. Two different control algorithms are proposed: PID and sliding modes, which are intended to keep the voltage output constant. This voltage is obtained from the control of the current at the output of the push-pull converter. The results of implementing the control algorithms in the converter are compared to determine which one presents the best response to changes in the input, in parameters such as: robustness, speed and efficiency. The Matlab / Simulink software is used to present the results and make comparisons of the simulations.

PID, Sliding mode, Converter push-pull

Desarrollo de un sistema de monitoreo de bajo costo para sustancias tóxicas

Development of a low-cost monitoring system for toxic substances

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Abstract

Industrial, commercial and service activities involve the production, storage and transportation of hazardous substances and materials. The identification of the risk factors in the facilities allows to establish the necessary and specific security measures to be applied in case of any eventuality, besides that it is one of the fundamental tasks for the elaboration of emergency plans that allow to safeguard the security of both individuals as of the facilities that are exposed to events such as leaks, fires and explosions due to toxic substances. In the market there are equipment for the monitoring of this type of substances, however, these teams have as their main drawback its cost. The main objective of this work was the development of a low cost monitoring system for toxic substances. The developed system is based on the implementation of the series of sensors of the MQ family. The performance of the developed system allows the monitoring of toxic substances within a range of acceptable precision, although according to the operating conditions of the sensors its use in continuous monitoring systems is recommended, since the sensors require a time of considerable preheating for good performance.

Monitoring system, Toxic gases, MQ sensors

Análisis de los efectos de la presión y temperatura en filtros pasivos bajo la Recomendación ITU-T G694.1

Pressure and temperature effects analysis on passive optical Filters for the ITU-T G694.1 Recommendation

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Abstract

The passive fiber optic filters are more common everyday in the optical communications systems because these don't require opto-electronic conversions in the network. The filters based on periodic structured elements or Bragg gratings have a reject band response in transmission or a bandpass response in reflection, which central frequency, responses to the physic and chemical characteristics in the grating. Changes in the applied temperature or pressure in the grating modifies the central frequency stability in the filter, then, the signals in the system could be affected shifting to higher wavelengths where could be overlapped with adjacent signals. In this work the pressure and temperature dynamic range parameters for passive optical filters were analyzed and proposed in communications systems for the ITU-T G694.1 recommendation with signals spacing of 12.5, 50, 100 and 200 THz. The results were obtained by the implementation and analysis of the coupling modes model solution for Bragg gratings.

Temperature, Pressure, ITU-T G 694.1

Automatización de una mezcladora didáctica utilizando el internet de las cosas para su monitoreo

Automation of a didactic mixer using the internet of things for monitoring

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Abstract

Automation gives the opportunity to perform continuous and effective processes in jobs that are unsafe or even impossible for people to do. Based on the above, there is a trend in recent years towards communication between the user and automated systems through the Internet, due to the ease in sending information from anywhere, making real-time monitoring possible. In the proposed system the design of the control of an automated didactic mixer for remote monitoring through a connection via Internet with the use of an embedded system, a mobile application and the concept of the internet of things is presented. The system is composed of a programmable automaton for control, communication interfaces, databases for sending and receiving information and a mobile application as an interface for the user. With this, we present an example of the possibility of implementing this system in a process, making it more efficient and safe for the team and the operator due to remote monitoring.

Automation, Internet, Monitoring

Análisis comparativo del estudio de flujos de potencia en series de tiempo por el cambio de paso en el muestreo de perfiles de carga y generación de sistemas fotovoltaicos interconectados aplicando métodos de interpolación adaptativa

Comparative analysis of the study of power flows in time series by the change of step in the sampling of load profiles and generation of interconnected photovoltaic systems applying adaptive interpolation methods

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Abstract

Time series power flow study has become an extended tool for evaluating power systems throughout time. The possibility to include output profiles from renewable energy with variability along the day, has allowed a better understanding of these technologies when they are interconnected to the grid. In this paper is presented a comparison analysis of time series power flow studies based on different step sampling of load and output PV profiles. The power flow algorithm based on Newton-Raphson has been extended to include step sampling of 1, 5 and 15 minutes. In cases when power flow studies are carried out with steps sampling of 5 and 15 minutes, these are used to estimate state variables at a smaller step sampling throughout cubic interpolation. State variable profiles estimated are compared with those obtained throughout time series power flow studies.

Time series power flow, Grid-connected PV, Load and generation output profiles, Step sampling

SIAM, la nueva solución al gobierno electrónico

SIAM, the new solution to electronic government

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Abstract

This article exposes the current situation and the benefits of the use of information and communication technologies (ICT) in the different government agencies, whether municipal, state, federal or parastatal, to improve qualitatively and quantitatively the services offered to the public and the business sector. At the moment of carrying out an administrative process, one usually thinks about loss of time, work permits to perform procedures in government office hours, uncertainty in each change of administration and a deep abyss in the procedures and low level of transparency. Therefore, the Municipal Service System "SIAM" has been developed, which will provide a solution to this approach in order to optimize services and streamline processes, especially the optimization of resources in a transparent manner, for example, the use of digital records in all dependencies. These aspects have promoted the accelerated use of ICT as tools for the management and development of appropriate models that resolve interoperability, security, compatibility and access to digital government, as is the case of SIAM.

SIAM, Electronic government, ICT

Acondicionamiento de señales Electromiográficas del antebrazo, utilizando el dispositivo Shimmer 3 EMG, para la integración en un sistema de fusión sensorial

Electromyographic signal conditioning of the forearm, using the Shimmer 3 EMG device, for integration in a sensory fusion system

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Abstract

In recent years, design techniques for robotic rehabilitation have evolved and robotic systems for rehabilitation have become popular in medical centers. Within the methodologies used, different tools have been used to verify the effectiveness of the therapy, with the objective of monitoring the rehabilitation process and showing conclusive evidence that the patient has concluded the process. This study shows the process of capture and monitoring of electromyographic signals (EMG) of patients who have lesions in the arms, and as well as healthy patients. The aim of the study is to determine the necessary data of EMG to classify the movements of an arm rehabilitation routine, to be integrated in a future fusion sensorial system, programmed into physical therapy evaluation software. The analysis and classification of the types of movements of routines applied to the rehabilitation of the arm is presented. The movements are characterized by the acquisition of EMG signals with the Shimmer3 EMG device, and the statistical analysis of mV in each of the acquisition channels. The characterization of the electromyographic variable is part of the integration process in the evaluation software for rehabilitation routines.

Data acquisition, EMG, Statistic

Unidad de monitoreo ambiental mediante un Vehículo Aéreo no Tripulado (VANT) para contaminantes criterio en perfiles verticales

Environmental monitoring unit using an Unmanned Aerial Vehicle (UAV) for criterion pollutants in vertical profiles

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Abstract

The present work discloses the design and manufacture of a prototype of a mechatronic air quality monitoring system, integrating a platform of a UAV, instrumented with a system of acquisition and transmission of wireless data in real time, connection with a ground station that allows the visualization and storage of the acquired data. A monitoring unit was designed for criteria pollutants: carbon monoxide, carbon dioxide, hydrogen and nitrogen dioxide. For the development of the project, a model based on the construction of prototypes was followed, a cyclic model represented by the following stages: analysis-design of the prototype, construction-review of the parts of the prototype, tests, evaluation-feedback of the results obtained. It is development is based on embedded hardware platforms and free hardware flight platforms, along with open source software resources. The article presents how the prototype is integrated, the design of the monitoring unit, its parts, as well as its adaptation to the UAV.

UAV, Polluting criteria, Monitoring

Estudio de aberración cromática usando un sensor Shack-Hartmann

Chromatic aberration study using a Shack-Hartmann sensor

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Abstract

This paper shows the implementation of a Shack-Hartmann aberrometer that allows the measurement of chromatic and monochromatic aberrations in a single experimental arrangement. The objective of this arrangement is to measure both chromatic and monochromatic aberrations of a traditional lens or mirror. The system was developed using commercial optomechanics and elements manufactured by 3D printing. The elements of the optical system are: commercial wavefront sensor, Keplerian telescope and various low-cost optical components. The light source is consisting essentially of a commercial RGB diode (462nm, 521nm and 631nm), controlled by Arduino development platform with a programming of pulse width modulation (PWM). The wavefront measurement is made with the manufacturer's software while the analysis of aberration coefficients is performed analytically. The three components under evaluation are commercial, which facilitates the assessment the operation of the instrument. The monochromatic aberrations and the chromatic aberration present in each lens are analyzed. The system can be used in research or optical testing in the manufacturing process. In addition, it is experimental arrangement that can be used in the courses of Optical Technology or Optical Engineering.

Aberrometer, Optical tests, Optomechatronic

Análisis preliminar estructural de un álabe de doble raíz de materiales compuestos para una turbina eólica de 3Kw

Preliminary structural analysis of a blade of double root of composite materials for 3Kw wind turbine

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Abstract

Researchers from the government and industry are anticipating the increase in the near future of wind farms with low wind speeds in the United States, Canada, Europe, China, India and Brazil. In addition, the manufacturer of wind turbines Siemens has declared that "it expects that a third of the global development of wind energy in the coming years will take place in areas with medium to low wind speeds" [1]. The previous scene can be applied to any part of the world, since the search for wind power can not be limited to ranges of high wind speeds. The medium and low speed winds can be exploited with technology designed for the specific characteristics of that specific resource. The present work, shows the structural analysis by means of the Method of Finite Element of a blade of double Root of low capacity for low speeds of wind (patent in proceeding before the IMPI). The blade is considered manufactured with composite materials. To justify the design, the cases of the simplified loading methodology contemplated in the IEC 61400-2 standard are considered. The results show evidence on the viability of these blades for commercial application.

Blade, Turbine, Wind

Desarrollo de un Prototipo de Asistente Personal Inteligente (IPA) de la Universidad Tecnológica de San Juan del Río

Development of a Prototype of Intelligent Personal Assistant (IPA) of the Technological University of San Juan del Río

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Abstract

This paper presents the development of Intelligent Personal Assistant (IPA), at Technological University of San Juan del Río (UTSJR), through voice recognition can answer questions about the information requested about the facilities of the Institution. The prototype methodology is used, which determines the perfect functioning in each of the stages, to continue with the next one. The prototype is developed in Java language, with C code support, compiling in Android Studio it is implemented in mobile devices with Android Operating System through a Raspberry PI card. The result is an IPA prototype, which interacts with a visiting user to UTSJR, which through a Natural Language Processing (NLP), obtains information from the School Services department, the integration of information from other departments is done with an administrator privilege access. It was implemented in twenty users, who visited the UTSJR, and the functionality and ease of interaction were evaluated where it is concluded that the functionality and ease of use are accepted. The IPA can continue to be implemented for different services in the institution with NLP.

Intelligent Personal Assistant (IPA), Speech Recognition, Natural Language Processing

Prototipo de control de acceso en la Universidad Tecnológica del Estado de Zacatecas

Prototype of control of access in the Universidad Tecnológica del Estado de Zacatecas

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Abstract

In this report the design and implementation of a prototype is exposed as a pilot test for the Technological University of the State of Zacatecas, focused on the control of access to laboratories and facilitating the automatic registration of attendance to classes, likewise reducing the time and effort on the part of the users that these tasks entail. The project is aimed at a public with basic knowledge of electronics and computer science with an interest in the area of automation, said project in the first instance revealed the physical structure of the system, then an analysis was made of different technologies that could be implemented, later a software application is designed which would allow, in the first instance, the administration of data thrown by the access control hardware, as well as provide usage statistics, contemplating the policies required by the institution, ending with the coupling of all the activities that constitute the prototype.

Prototype, System, Access

Desarrollo de sistema web de búsqueda inteligente para rutas de transporte

Development of smart search web system for transportation routes

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Abstract

One of the problems that citizens face every day and that with the passage of time has been intensifying, becoming a first obstruction in civil displacement within the state, is the identification of public transport systems; be it your routes and the locations of relevant sites that are on the way. Due to the high demand of vehicles and the frequent need to move from one place to another, this project aims to facilitate the process of acquiring information regarding the destinations desired by the user in order to have better alternatives to reach the required destination the best way possible. The suggested method is an efficient search system, implementing a web platform, which requires a destination location and a source location to guarantee the search. To obtain the routes, the coordinates of both locations are compared with those of the transportation routes, the ones with the shortest distance are taken and as a result the user can observe three options that will allow him to choose the one he considers best. The SCRUM methodology for the development of the application is based on design, construction and testing.

Web Application, Transport Routes, Smart Search

Prototipo de aplicación móvil “Dilo con Señas”

App prototype “Say it with Signs”

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Abstract

Human beings perceive the information of the world that surrounds us through our senses, it is not even possible to imagine the human being without them, however for various reasons these natural perceptions of human beings are affected. People who see their auditory sense diminished, are known as weak hearing, those whose loss is partial is called hearing loss, or total anacusia is determined, aphonia is also presented which is a disability (partial or total) to communicate verbally. This project presents the mobile application prototype "Say it with signs" which aims to contribute to improve learning of the Mexican Sign Language (LSM) through various interactive activities that promote learning for both people with communication difficulties and those close to its surroundings. For the development of the prototype App Inventor was used, the methodology used was Prototype. The app was oriented to Android platform, the activities are focused on the teaching of the alphabet dactilológico. The impact of this application will be to improve communication of people with different abilities with their environment.

Mobile App, LSM, Hearing Loss

Diseño de un prototipo de tapa - asiento de WC automatizada

Design of a prototype lid - toilet seat automated

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Abstract

Design of a prototype of an automated toilet lid that allows men, women and children to raise / lower the lid or the seat of the toilet when they urinate or defecate in the toilet, just by pressing a button. The project lays its foundation in the problem that occurs between men and women that sometimes the man wet the seat with urine at the time of going to the bathroom, and that the man does not want to touch on seat with his hands / fingers before urinate for fear of getting an infection by touching your limb after lifting the toilet seat. For the above is to investigate, design and create a prototype automated WC cover, which works with servomotors controlled by two buttons, one of them serves to raise / lower the toilet lid and another of them to lift / lower the toilet seat. To control the actions of the buttons, it was necessary to analyze how to control the movement of the servomotors in their 90° rotation, the mechanical adaptations and the wiring, whether to open or close the lid or the seat separately, or both to same time.

WC cover, Servomotors, Control

Evaluación de tecnologías solares para la deshidratación de la nuez de la India (Semilla de marañón: *Anacardium occidentale*) que se produce en el Estado de Campeche, México

Evaluation of solar technologies for the dehydration of the Indian nut (Marañón seed: *Anacardium occidentale*) that is produced in the State of Campeche, Mexico

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Abstract

The nut of India has been consumed for hundreds of years in South America thanks to the many beneficial properties it has. The characteristics of the dehydration of the marañón seeds are presented using a nonconvective oven at controlled conditions: 55°C and 65°C, obtaining drying times of 1280 and 1080 minutes, respectively. It was dehydrated in the open sun and in a direct solar cabinet dryer, obtaining average drying times of 1400 and 1020 minutes, respectively. The temperature in the highest drying chamber was 58.8°C. The tests were carried out in the Faculty of Engineering of the Universidad Autónoma de Campeche, in Campeche, Mexico, located at 19°51'00" north latitude, and 90°31'59" west longitude, with hot-humid climate, average maximum values of irradiance solar of 970 W/m². The final humidity of the dried walnut ranged between 6% and 4%. The drying time in the cabinet was shorter due to the fact that natural convection can reach higher temperatures or very close to 55°C. The results show the viability and technical feasibility of the solar drying of the Indian nut in the cabinet, obtaining an added value and an important energy economy.

Direct solar dryer, Drying with controlled temperatures, Natural convection Drying kinetics

Diseño de una interfaz gráfica en LabVIEW con enfoque didáctico, para la comunicación con el sistema de diagnóstico a bordo OBD2 en vehículos automotrices

Design of a graphic interface in LabVIEW with didactic approach, for communication with OBD2 on-board diagnostic system in automotive vehicles

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Abstract

A program was made in the LabVIEW® software which allows the communication with the diagnostic OBD II system of automotive vehicles, which was used in a didactic way for a real-time monitoring of the information provided by the sensors to the control unit of the engine (ECU), likewise it gives access for reading and deleting DTC codes. The program that was made in LabVIEW® consists of three blocks; the first one used for the communication between the CPU and the ECU, for which and ELM327 integrated circuit is used, that works as an interpreter between the CPU and the ECU. This circuit permits the communication with most of the protocols, it is easy to use and has low cost. The second block consists of an algorithm that lets the user to choose the data que wants to request to the ECU, because it is necessary to identify the mode of operation and the type of parameter to request. In the third block the user decodes and interprets the information issued by the ECU

LabVIEW, OBD-II, ELM327

Convertidor SEPIC para MPPT (Maximum Power Point Tracking) en Turbina Eólica

SEPIC Converter for MPPT (Maximum Power Point Tracking) in Wind Turbine

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Abstract

In this work the application of the Maximum Power Point Tracking (MPPT) is performed in a wind turbine emulator with permanent magnet generator; for this a synthesis of the obtaining of the dynamic model of the turbine is made. The dynamic model determines the behavior of the proposed turbine that corresponds to a horizontal axis wind turbine, which is the basis for the implementation of the wind turbine for experimental purposes. An AC motor is used which is coupled to a permanent magnet generator. The AC motor will simulate the speed of a real wind turbine based on the result of the program that solves the dynamic model; For this, a commercial voltage source inverter will be used, which will be responsible for controlling the motor at a reference speed by said program. Finally, a SEPIC converter is implemented to vary the speed of the wind turbine rotor and thereby obtain the maximum possible use of wind energy.

Wind Turbine, MPPT, SEPIC Converter

Diseño e implementación de guante para LSM

Design and implementation of LSM glove

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Abstract

The hearing impairment generates great barriers in the labor and social insertion. The sign language (SL) has been a great support for the integration of deaf people in their work and educational environment, however, very few people learn sign language besides the fact that most of the people without this disability do not know the language. In the current work we present the a glove design and implemented for the interpretation of Mexican Sign Language (LSM) to voice. The glove was designed as an LSM tool interpreter for inclusive schools which supports the academic and social training of people with hearing disabilities, allowing teachers and classmates effective communication with people with this disability. The glove is part a one system that integrated the LSM grammatical rules giving a sense to the sentence and allowing the correct interpretation among the users, which makes it a useful tool for inclusion, as well as allowing to create a database with words, ideas and phrases. The open source allows the development of a versatile and accessible system for inclusive institution.

Hearing impairment, Interpreter glove, Inclusive schools

Diseño de un banco de pruebas estáticas y de fatiga para Álabes de micro turbinas eólicas

Design of a static and fatigue test bench for micro wind turbine blades

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Abstract

To verify the reliability and resistance of a blade of a micro wind turbine, a static and fatigue test of the complete blade is required, these tests are realized in a test bench allowing to certify the blade and improve the performance, Through the test is guaranteed that it will work and will not occur a failure that may end in an accident. The test also allows identifying inadequate designs and determining the zone of risk. to test accurately resistant test equipment are required. In this research, different test benches proposed for blades up to 2.5 m long will be analyzed and the structural design will be carried out using finite element software, For the application of loads on the structure the IEC 61400-2 standard is used, the new proposed structures are made known, and may be used by any researcher or company for the analysis and certification of micro wind turbine blades.

Design, Testing bench, Blade

Panel codificado en Matlab para calcular las regiones de estabilidad de controladores PI y PID

Coded panel in MATLAB for the computation of the stability regions of PI and PID controllers

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Abstract

This paper presents a coded panel in MATLAB for the computation of the stability regions of P (Proportional), PI (Proportional-Integral) and PID (Proportional-Integral-Derivative) controllers applied to linear time-invariant systems. The programming code in MATLAB is based on recent research work, which presents the mathematical foundations for obtaining the stability regions of the PI and PID controllers. This panel is adapted in such a way that it is user-friendly to the designer and only requires some input values to perform the corresponding calculations and graphically display the stability regions of the system to be analyzed. Once the stability regions are deployed, the user can carry out an analysis of the behavior of the system by selecting points within those regions and displaying the time response for the selected conditions. This facilitates the design and analysis work of PI and PID type controllers that are widely used in industry.

Panel, Stability, PID

Guante multisensorial para dactilología con respuesta mejorada mediante el empleo de bluetooth y regresión lineal

Multisensory glove for dactylogy with enhanced performance by using bluetooth and linear regression

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Abstract

The use of the arithmetic mean as a statistical method is frequently, but some times it is not satisfactory. In this way, it developed as a first prototype of Mexican Sign Language (known by LSM) dactylogy translator attached to multisensory glove, computed by the arithmetic mean of the voltage variability values from the signals of each finger in order to determine which letter was made by the user. The efficiency of the latter process is about 70%, and because of that, an alternative design is presented in this article in order to improve the performance of the device and reduce its overall size. This alternative design involves the use of linear regression, correlation coefficient to predict particular LSM signs, and Bluetooth technology. By implementing the design described above, the prototype size was significantly reduced, and thus, it became more portable. In addition, the software application became more robust. The use of the two statistical methods increased the overall reliability in determining the right letters chosen by the user in about 20%. This was accomplished through the assignment of linear equations for each letter and verification of correlation coefficient values close to 1.

Multisensory glove, Dactylogy, Linear regression

Determinación de metano a partir de biomasa de nopal y abono vacuno

Determination of methane from nopal biomass and cattle manure

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Abstract

It is necessary to look for bioenergetic alternatives using as substrate the residues of species that have resistance to adverse factors, low input requirements and technology, which is presented by the cactus, also presents high productive efficiency of biomass in restrictive soil and water conditions. The cactus (*Opuntia* spp) can be classified as a sustainable energy option. Nopal was used in addition to cattle manure in a 10: 1 ratio as a source of substrate for the generation of biogas. A concentration of 8000 ppm of methane was reached, using this substrate in the constructed biodigester. Biogas is a renewable source of energy that can be used in rural communities for domestic use. A problem presented in the experimentation is the determination of the methane obtained with various mixtures of prickly pear and fertilizer, moreover an economic form of determination, the new technologies offer versatile and easy to use devices, which can be integrated into software with acquisition cards of data and thus obtain experimental data.

Bioenergy, Sensor, Methane

Desarrollo de aplicación web para el almacenamiento privado de datos en la nube

Development of a web application for the private storage of data on the cloud

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Abstract

Currently, cloud storage is one of the most significant applications of the Internet. There are several data storage companies that work with huge data processing centers. Users, mainly companies, that request these services buy or rent the necessary storage capacity, and the data storage companies manage the configurations according to the requirements. It is normal for users to manage the storage and operation of the files as they wish. But most services are limited in terms of very specific configurations if an extra cost is not paid. For this reason, the present research is oriented to the design and development of a web application which allows to store files in the cloud by means of a domain name, in addition to granting specific permissions and access for each of the users in each of the folders, thus obtaining a private storage service at a low cost compared to other recognized companies.

Cloud storage, Private systems, Web application

Algoritmo para la optimización de Sistemas Híbridos Renovables

Algorithm for optimization of Hybrid Renewable Systems

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Abstract

This paper shows the development of an algorithm for optimizing a hybrid microgeneration PV/wind/diesel/battery system. Information about the available renewable resources in the region where the system could be installed, the required energy demand and the cost of each component is provided to the algorithm. The algorithm uses the information in order to estimate the energy balance each hour, over a year, to calculate the periods of over-demand and over-generation. Based on possible component combinations provided by the user, the algorithm determines the total annualized cost (TAC) and the cost of energy (COE) for each combination. With this information, an optimum combination of components can be obtained for meeting the load demand with an affordable cost. In addition, the algorithm determines other useful information, such as the annual diesel consumption and CO₂ emissions produced by the system in a year. The algorithm was implemented in MATLAB for a stand-alone system and as case of study, an aquafarm located in the municipality of Alvarado, Veracruz, Mexico, was considered.

Algorithm, Microgeneration system, Optimization

Comportamientos Reactivos para Robótica Móvil

Reactive Behaviors for Mobile Robotics

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Abstract

This article describes some reactive behaviors that are implemented in robotics for the interaction of the robot and the environment in which it is located, the programming of these behaviors seeks to give the robot tasks with a certain degree of intelligence. Under the Pololu and Arduino platform, this behavior is developed for a 3 Pi mobile robot of differential configuration in which, using infrared sensors, it is capable of executing navigation, avoiding obstacles in its path and avoiding any type of collision with its surroundings. The communication between the microcontrollers is through serial (RS-232), depending on each other to carry out the scheduled task, being the pololu the master and the arduino the slave. The Pololu 3 Pi is the first one in charge of detecting obstacles in its path, by means of an infrared sensor placed in the front part, which causes the robot to stop completely at a certain distance and send a data through serial communication to the arduino who activates a servomotor with another infrared sensor to be able to carry out a sweep of 0° - 180° , taking every 20° distance measurements this to determine in which angle it is more possible to advance.

Robot, Pololu 3 Pi, Arduino, Navigation, Reactive Behavior

Sistema para el monitoreo remoto y análisis estadístico de la información energética disponible para optimizar el uso de arreglos de paneles solares

A system to remotely monitor and statistically analyze the available energetic information to optimize the use of solar-panel arrays

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Abstract

One of the most important aspects to take a decision making throughout the design and control process for an installed photovoltaic system is the availability of the solar energy information on the working site. For this, pyranometers are used, which are devices for measuring the global solar radiation that affects a certain place on the Earth surface. This paper reports the development of an electronic system for the monitoring and statistical analysis of the energy that the sun delivers over the Yucatan peninsula, Mexico. It proposes a semiconductor-based pyranometer design, which connected to a system with stages of signal conditioning and data acquisition, sends the information of available solar energy to a computer through a wireless link. Performance results of the first measurement tests of the proposed system compared to a commercial system are shown. The information obtained will be used in the design and control to optimize the operation of an array of solar panels connected to the electrical grid.

Semiconductor pyranometer, Irradiance, Photovoltaic power

Método genérico de programación para máquinas herramientas de 3 ejes con control numérico computarizado (CNC)

Generic method to programming numerically controlled machine tool with three axis

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Abstract

Technological Universities have included subjects in their educational programs which involve the use of Numerically Controlled Machine Tool (NCMT). These machines like three axis machining centers are programmable and use tools with cuttings edges for the manufacturing a lot of pieces produced per batch, molds and die. This work explains a teaching method to program Numerically Controlled Machine Tool, which is based in standard ISO 6983. Its main advantage is to permit to the programmer identify syntax to create toolpath cut, regardless control's type and machine's brand. Method combines the rectangular cartesian system of absolute coordinates and rectangular cartesian system of relative coordinates through to use two syntax to create toolpaths cut with circular movements either it using radius magnitude or circle's central coordinates, obtaining six ordered structures of programming. Ordered programming will let that programs will be easily maintainable, become scalable and simplify their depuration. These characteristics avoid personal injury, damage to the machinery and high costs associated with services repair.

Manufacturing, CNC, Programming, Syntax

Diseño de material multimedia para el desarrollo de recursos didácticos en el aprendizaje de la Lengua de Señas Mexicana (LSM)

Design of multimedia material for the development of didactic resources in the learning of the Mexican Sign Language (LSM)

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Abstract

According to the results of the (INEGI, 2014), of the 119.9 million people in the country, 6% (7.2 million) have disabilities, 33% (2.4 million) have hearing problems. The MSL has its own syntax, grammar and lexicon; it consists of visual signs with its own linguistic structure, with which deaf people in Mexico are identified and expressed. (CONADIS, 2016). The purpose of this research was "to design multimedia material with contents of the Mexican Sign Language so that people with deafness, hearing loss or aphonia can have a didactic resource that allows them to improve their communication autonomy. The selected methodology was "development of multimedia projects", phases: idea, design, prototype, production, testing and distribution. As a result, multimedia material was generated (López, Rodríguez, Zamora, & Esteban, 2006) developing images of ideograms and signatures in the categories of alphabet, learn (family, fruits, numbers, school, house, months, days, toys, animals and colors), in the section of practice (memorama and write it down), and in the Conversa a translator, this material was incorporated into a mobile application to improve the quality of communication, inclusion and boost the improvement of its autonomy, it was evaluated by students from the Multiple Care center (CAM) Huejutla No. 8.

Inclusion, Multimedia, Communication, Language, Signs

Modelo teóricoevaluación de la efectividad de la técnica co para el diseño de un videojuego como recurso didáctico en matemáticas

Theoretical model for the design of a videogame as a didactic resource in mathematics

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Abstract

The extensive use of mobile devices among the population, particularly young people, can be used as a resource to motivate better academic performance. When there is an interest in developing mobile applications for engineering students, and the possibility of designing a videogame, in order to improve the learning in basic mathematics required by aspiring engineers, there is a double benefit. Designing a video game for educational purposes requires a pedagogical analysis, and a teacher who wants to use a videogame for his pedagogical intentions requires a video game programmer to perform an analysis of the game-learning relationship. The motivation and involvement generated by a video game can be used for educational purposes, so a game designer and a teacher designing a learning sequence can use the Cognitive-Affective Theory of Multimedia Learning, the Game Object Model, and the Learning Mechanics-Game Mechanics model as a basis for the analysis of their proposal. In this paper, a theoretical proposal for the design of a video game that completes the learning of basic concepts of mathematics for engineering is presented.

Video games, Math learning, Serious games

Aseguramiento de integridad de datos para el sistema de encuestas del ITSH

Assurance of data integrity for the ITSH survey system

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Abstract

Data integrity is one of the essential properties to take in consideration when using databases, mainly if it's about a database located into a server, which is fed in asynchronous way from several mobile devices. In this case, it's a system for survey application inside an Institute, where teachers collect information from students, they store it in their mobile devices and later send it to the server for their concentration; part of the data that receives the server must be distributed among all mobile devices used for survey application, so that said data serve as input data in the capture of new surveys applied subsequently. At the time of store data in each mobile device, a primary key is internally generated, which can be different from others devices, even if it's the same information; when this records arrive at the server, it must be identified it is the same data and generate a general primary key that must be sent to all mobile devices to be used in the application of new surveys

Integrity, Databases, Multiplatform

Desarrollo de un robot móvil controlado vía internet y ubicado mediante posicionamiento global

Development of a mobile robot controlled via internet and located by global positioning

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Abstract

Currently the technology has performed significant advances in the development of mobile robotics, as much as autonomous systems as remotely controlled. In the present work is shown the development and implementation of a mobile robot manipulated through wifi and geographically monitored through a global positioning module. To performed the signal processing a microcontroller is used, which receives the information for the manipulation and location of the robot using a wifi communication module and a GPS module respectively. A bidirectional communication is established via wireless to a computer with internet access using a virtual instrumentation interface, where data are sent to manipulate the robot and the location coordinates are received and displayed on a location map. The advantage of the development of this device is the possibility to perform explorations in difficult access and high-risk areas to the human being. In addition, such device could be used as a platform in the research area and in the industry by adding sensors to obtain information in the detection of different variables, such as; gas, temperature, pressure, humidity, etc.

Mobile robots, GPS, Wifi, Microcontroller

Detección de fallas en un sistema de tres tanques interactivos

Fault detection in an interacting level systems with three tanks

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Abstract

This paper proposes an algorithm for fault detection in an interacting level system considering three tanks. In order to extend the results obtained in simulation, the physical system was developed to validate those results. The method considers an observer-based approach that facilitates the design of residual generators. First, following a classical approach, the original system is decoupled in different subsystems, in such a way that each subsystem is sensitive only to one particular failure. Subsequently, the residuals are generated from an observers bank, where a different observer corresponding to each of the decoupled subsystems. Finally, in order to corroborate the results obtained in simulations, several experiments were developed with the real physical system. Where the system is conformed by three tanks where they have ten liters of capacity, two water pump who perform the function of actuators and sensors of level and flow. It is important to note that the faults are presented in sensors and actuators.

Faults Detection, Observers, Level System

Diseño y construcción de un pico-satélite educativo CanSat denominado WashiSat

Design and construction of an educational CanSat pico-satellite called WashiSat

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Abstract

It is described how a CanSat pico-satellite was designed and built to compete in the 3rd National Contest of Educational CanSat Pico-Satellites at the Instituto Tecnológico Superior de Tepeaca (ITST). Students of Engineering in Information Technologies and Communications of the ITST with the support of teachers from that institution designed the pico-satellite called WashiSat. Following the method in V, the mission was conceptualized, which was the simulation of a vertical landing, the requirements and architecture of all the stages of WashiSat were specified. Starting from the architecture, the printed circuits were designed and built, the components and the different sensors were welded to measure the variables of: temperature, relative humidity, global positioning, vibration and acceleration, these variables were sent in real time to a conformed earth station for a laptop on which the variables were plotted. In addition, a mechanical structure was designed that was printed on a 3D printer which would simulate the vertical landing. Thanks to the excellent work carried out, the first place was obtained in the 3rd National Contest of Educational CanSat Pico-Satellites in the telemetry category

CanSat, Method in V, Pico-satellite

Sistema de visión embebido para detección de movimiento de forma remota utilizando el internet de las cosas

Embedded vision system for remote motion detection using the internet of things

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Abstract

At present, vision systems are used to automate or improve a process, in this proposal it will be used for remote video surveillance assistance, which decreases the error that a system can have when monitoring security cameras. The system is based on free software and embedded systems, is able to detect errors generated by the human factor, for example, distraction of the watchman, low resolution on the screen to distinguish activity in the observability of the cameras. To solve this type of problems, a vision system was implemented in which three motion detection algorithms called Resta, MOG and MOG2 were used, to which light and background update tests were applied to obtain the most suitable algorithm. The system detects if an intruder enters a prohibited area or if an object is removed. The vision system encloses in a black rectangle the area where activity was found, alerting the user to take the necessary measures.

Remote video surveillance, Vision system, Embedded system

Software para el Diseño de Circuitos de Microondas

Software for the Design of Microwave Circuits

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Abstract

The use of computational tools for the design of elements and microwave circuits has spread around the world by research centers, universities and companies whose function is related to the development of communications devices, computer equipment, networks, among others. Although it is worth mentioning that the cost of these tools is somewhat expensive for personal or educational use. The present work shows the software tool with didactic purposes for the design of Waveguides (rectangular and circular), Narrowband and Broadband Coupling Networks (Transformer of $\pi/4$, L-type networks, STUB, Binomial and Chebyshev) using microstrips; through a graphical interface, showing to the user the dimensions of the microstrip structures that form the designed circuit. The application aims to add modules for designing new circuits and in the future to have the ability to allow the user to integrate their own modules (doing the compiler task) to interconnect them with what allows them to design the software. The application is intended to be free for users and universities or technical schools to have tools for the design of microwave circuits.

STUB, Network, Impedance Coupling

Evaluación del nivel de emisión de radiación de un sistema Wi-Fi aplicando la norma UIT-T K.62

On Wi-Fi system radiated emission level according to UIT-T K.62 recommendation

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Abstract

This paper presents a simplified mathematical model to evaluate a WiFi system radiated emission level in according to UIT-T K.62 recommendation. This model is, in fact, a stationary stochastic process and we generate its probability density function through an algorithm that makes it possible to obtain the compliance probability of the system. The use of wireless communication devices has been increasing exponentially. Due to advances in technology, now each user can use different WiFi-connected devices to perform their various activities. According to the standard of the International Telecommunication Union, ITU, ITU-T K.62, each wireless communication device complies with the electromagnetic compatibility requirements such as the radiated emission level. However, due to the large number of devices receiving and transmitting on a common frequency, the superposition of the emissions that are generated could exceed the maximum emission level allowed. Currently there has been little study on radiated emissions using mathematical models and the effects that exposure by multiple devices in a given place.

Compliance probability, Radiated emission level, UIT-T K.62

Sistema web integral de Gestión Académica y Vinculación para red temática de colaboración

Integral web system of Academic Management and Bonding for collaborative thematic network

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Abstract

This article describes the process of analysis, design, development and technological implementation carried out within the framework of the Collaborative Thematic Network: Sinergia Academia-Empresa MyPyMES de México, recognized since 2015 by the Programa para el Desarrollo Profesional Docente, para el tipo Superior (PRODEP), made up of the Research Groups (RG) UTJAL-CA-2 of the Universidad Tecnológica de Jalisco (UTJ), the UTBB-CA-1 of the Universidad Tecnológica de Bahía de Banderas (UTBB) and the UTTT- CA-5 of the Universidad Tecnológica de Tula Tepeji (UTTT). This process required the implementation of the agile SCRUM methodology for the creation of a web system that automates the management of academic production, technological development and the binding agreements generated by the CAs. This application will allow to establish control mechanisms for products derived from research and technological development projects, allowing consultation to all members and collaborators of the network, in addition to generating production statistics by research line, member or collaborator. This will make it possible to direct the work efforts of the entire network for better management of resources, in addition to establishing follow-up mechanisms for all processes.

Academic Management, Academic Production, Web Development

Sistema de Control de Recursos Humanos

Human Resources Control System

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Abstract

This paper presents the design of a Human Resources Control System, with the purpose of automating the process of information in this area. The user interfaz is developed in Netbeans 8.1, for the database the Structured Query language (SQL) of MySQL is used and jReports is used for the records. Based on our knowledge, there is no tool that adapts to the specific needs of the institution; In addition, this system can fit to any other educational institution like the same control standards are followed. The Universidad Politécnica de Francisco I. Madero (UPFIM), as a public organization, is obliged to administer the files of teaching, administrative and support personnel. This is a very complete process due to the increase of the staff in the institution and the Human Resources Department needs to answer to the requested reports by the federal and state governmental instances, for the generation of statistics. In this side, UPFIM looks to have accurate information, complete and on time, regarding staff management.

Control, Digital Records, Systematized Information, Human Resources

Análisis y diseño del objeto de aprendizaje de las estructura de datos: Grafos

Analysis and design of learning object in data structure: Graphs

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Abstract

The study of Data Structures is essential in Computational Sciences programs, therefore, it requires didactic strategies between Information and Communication Technologies (ICT), supporting learning process with digital teaching resources. Educational institutions have been given the task of creating digital environments constructed in such a way that each course can be divided into units of knowledge by means of adequate resources that explain, guide and motivate the student to enrich their learning in a dynamic way through the interaction of Learning Objects (LO). The contribution of this research about learning experience through technology, which integrates the study of multimedia elements in Web and the Instructional Model ADDIE for the design of OA oriented data structures and specifically for the non-linear structure: graphs. The OAs are supported by the Digital Communities Platform for Higher Education Learning (CODAES). By the other hand, the usability tests were carried out with a focus group of students of Engineering of Computational Sciences, revealing results referring to the degree of satisfaction and learning of the students.

OA, Graphs, Digital

Representación en mapas temáticos de principales cultivos del Valle del Mezquital para toma de decisiones

Thematic maps wich represent the main crops of el Valle del Mezquital for decision-making

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Abstract

In Valle del Mezquital region, one of the main economic activities is agriculture, this work consists of the abstraction of statistical data on maize and alfalfa crops: Area sown, harvested area, yield, average rural price (ARP) and value of production, these data are consulted in the databases of SAGARPA, SIAP and SIACON. The intention is to process different types of data and represent them in thematic maps as visual information, which results faster reading and simpler interpretation. The methodology called MMT is applied; this consists of phases of collection, analysis and interpretation, design, evaluation and documenting, (Lozada, 2016). The software needed is Excel, Open Office Calc, WEKA and software Digital Map of Mexico. It is possible to compare visual information with the creation of thematic maps, this facilitates decision-making to the farmers, for example they can verify the yield trend, allow predict if it will have a growth or decrease, as well as the impact this can generate in the price they can have in the market.

Thematic map, Agriculture, Statistical data

Recursos tecnológicos en la transformación de la asesoría disciplinar

Technological resources in the transformation of the disciplinary advisory

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Abstract

The high rates of failure, dropout, lag and low rates of terminal efficiency are challenges that Higher Education Institutions have to face. To try to reduce this situation, various strategies are implemented, one of them being disciplinary advice. It is conceived as the set of strategies that the teacher implements to support students in the acquisition and reinforcement of specific learning of a subject in which it is not necessarily the titular teacher. Therefore, each student requires a personalized accompaniment, which provides the necessary foundations to make better decisions regarding their professional training. What it means to identify the technological resources that the teacher uses in the counseling, as support to facilitate the learning of the students. Therefore, the following question arises: How can the failure rates of students at UAEM Valle de México University Center be reduced, using technological resources in disciplinary consulting? The aim is to identify the ICTs that teachers use, describe their uses and determine their level of updating. A mixed methodology was used to know what technological resources are used and how to design, apply and evaluate the strategy.

Disciplinary advice, Technological resources, Reprobation

Sistema de control de incidencias de profesores de la Universidad Tecnológica Fidel Velázquez (SCOIN)

Incident control system for teachers of the Fidel Velázquez Technological University

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Abstract

The Professors of the Fidel Velázquez Technological University check in and out, for the entrance there are 10 minutes of tolerance, there are minor delays (minute 11 to 15) and major delays (minute 16 to 30). The Professor can have 4 minor or 2 major delays or the combination of both without exceeding 4 delays in a month without discount. The Professor has 3 entry-exit permits of maximum 5 hours in a month without penalty. He also has 3 leave of absence during a four-month period without penalty. The development of this work consists of designing and developing an incident control system to help the Professors to manage their delays and permits. Each time a delay or permit is registered, the system will indicate how many are available or if they have already been used up. In addition, the system will register permits that do not have sanctions such as absences without pay, consultations to the medical service or commissions. The system will perform queries, inserts, deletions and updates of delays and permissions, print the permits forms, as well as generate reports of delays or permits, all this in a dynamic web page based on a mysql database and javaserver pages.

System, Mysql, Javaserer Pages

MOFI-PLAY: Prototipo de herramienta de apoyo para la rehabilitación y estimulación de la motricidad fina de las manos para niños de nivel preescolar

MOFI-PLAY: Prototype of support tool for the rehabilitation and stimulation of fine motor skills for preschool children

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Abstract

Mofi-Play deals with fine motor skills of the hands and with this it intends that the children of this stage develop or recover their skills and abilities. Is proposed as a software tool with ludic activities using an infrared device that will support children with a lack of fine motor skills in two different circumstances: stimulation and rehabilitation. In the stimulation will help to increase their skills and abilities, while in rehabilitation, will help reactivate this motor skills for some type of injury that has been suffered. This prototype considers the preschool age as it is the moment in which fine motor stimulation is an important factor for the child's formation, since it is when he develops the cognitive areas such as compression, relationship, adaptation and interaction demonstrated by tasks such as: trimming, paint, draw, etc. The development of this motor skills is characteristic of this stage because it acquires new manual skills that allow you to use your hands and manipulate small objects with greater dexterity and coordination. On the other hand, in rehabilitation, fine motor skills are important since it crucial to recover the independence and autonomy of the patient in tasks that involve the movement of their hands.

Haptic-interface, Rehabilitation, Software

Aplicaciones móviles alternativas para mejorar la comunicación de personas con discapacidades auditivas y del habla

Alternative mobile applications to improve the communication of people with hearing and speech disabilities

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Abstract

This project seeks to develop the mobile application "Dilo con Señas version 1.0.1" at the Universidad Tecnológica de la Huasteca Hidalguense (UTHH). The research is based on the Mexican Sign Language because in Mexico there is a large number of people who have communication difficulties due to hearing or speech disabilities (hearing loss, cofosis or anacusia and aphonia); for this reason, the main objective is to improve the communication and interaction process of these individuals with their immediate environment through the implementation of mobile applications. Due to the above, the idea of developing an application for Android devices in versions 4.1 or later, taking advantage of the fact that most users of mobile terminals have this operating system. The methodology to be used is Mobile-D, considered appropriate to potentiate the development of mobile applications. It is intended that the application has a menu of four options: Alphabet, Learn, Practice and speak, so that learning is carried out through multimedia resources. Finally, this application is of great impact for the population in general because it improves the quality of life of people who have some hearing and communication disability, facilitating interaction with society.

Application, Disability, Mobile-D

Uso de código QR en caso práctico: gestión de contactos mediante dispositivos móviles

Use of QR code in a practical case: contact management through mobile devices

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Abstract

Objectives General: Develop a mobile application for the generation, reading and storage of business cards in QR format.

Specific:

- 1.-Collection of information of QR codes.
- 2.-Identify mobile applications that use the generation, reading and storage of QR codes.
- 3.-Analyze the information collected.
- 4.-Design the application.
- 5.-Encode the application.
- 6.-Conduct tests.
- 7.- Document the application

Methodology: We will use Extreme Programming

Contribution: With this work it is provided that the QR are the most suitable for saving and sharing business cards. In addition to an ecological and economic contribution to decrease by eliminating the use of paper in the manufacture of physical cards, with the consequent reduction in deforestation. We insist that the main importance lies in the impact on the environment; deforestation and excessive use of water, as well as its contamination. And above all, the use of technology for the care of the environment, replacing polluting processes with clean processes.

QR code (Quick Response Code), Coding, Decoding

Traductor bidireccional de lengua de señas Mexicano a Español

Bidirectional translator of Mexican sign language into Spanish

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Abstract

The National Development Plan 2013 - 2018 shows that in Mexico there are more than 5.7 million people with some type of disability. The National Survey of Demographic Dynamics 2014, indicates people disability is 6.7%., the percentage of schooling in Higher Education. In Hidalgo there are per each thousand habitants 56 people with disabilities. The proposal for this research, is to develop an Information System that is used as Bidirectional Translator of Mexican Sign Language to Spanish (TB-LSM), with the purpose of contributing to facilitate inclusion, reduce inequalities and the creation of a society of rights and equal opportunities for students with hearing and / or speech disabilities in Higher Education Institutions. The methodology is divided into four phases: 1) Obtaining information; 2) Calculation of distance between the fingers of the hand; 3) Identification of the rotation of the wrists of the hands; 4) Identification of the sign. In this first phase, the analysis made for the proposal of the previous phases is shown, to start with the translation of the LSM into Spanish.

Inclusion, Kinect, Education

Aplicación Móvil con realidad mixta para estimular las habilidades psicomotrices de niños con síndrome Down

Mobile application with mixed reality to stimulate the psychomotor skills of children with Down syndrom

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Abstract

The Internet of Things has popularized the use of mobile applications to perform daily activities and its progress will continue unstoppable as estimated. The objective of this work, computer technology is use to develop a mobile application that is attractive and stimulating for children, using the multiplatform software Unity3D to combine both augmented and virtual realities, making mixed reality to use it in an app that helps improve the psychomotor and cognitive skills of children with syndrome Down. Both physiotherapists and psychologists agree that children should be encouraged with this condition at an early age, so they acquire more muscle tone and can perform activities as common as crawling, sitting and walking. Therefore it is important to start therapies since they are babies and what better to do it using useful and fun tools at the same time. The purpose of this project is to provide an app that serves to have a innovative alternative that helps and makes this a simpler task for parents, which serves as a guide to exercise their children and at the same time is attractive to them, it was built to be seen and feel more like a game rather than a therapy.

Virtual Reality, Augmented Reality, Syndrome Down

Las tecnologías de la computación aplicadas al ejercicio de la transparencia de los municipios del estado de Oaxaca

The computing technologies applied to the transparency exercise in the Oaxaca state municipalities

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Abstract

In Oaxaca, the body in charge of verifying the management of public resources that they are assigned to the municipalities is the Institute of Access to Public Information and Protection of Personal Data (IAIP). It promotes the development of a computer system called "Sistema de Transparencia Municipal" (SITRAM), which aims to bring the technologies of computing to municipalities geographically far from the state capital, encouraging them to comply with their accountability and thus promoting the exercise of transparency. The system allows the uploading of information under the control and support of the IAIP, referring to articles 70 and 71 of the General Transparency Law, articles 30 and 36 of the LTAIPO and the Government Accounting Law. Through "flags", it sends alerts to both municipalities and the IAIP, on the status of the information; it has been published, sending notifications to municipalities to make their publications on time and correct format, generating the corresponding reports the status of municipal transparency in the State. It also allows citizens to consult and download information that municipalities upload to SITRAM

Computer technologies, Municipal transparency, Public resources

Desarrollo de software de simulación ERP para herramienta didáctica en el proceso de enseñanza-aprendizaje

Development of ERP simulation software for didactic tool in the teaching-learning process

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Abstract

The objective of this research project is to design and develop a didactic simulator for the administration of a company based on an ERP (Planning of business uses). The software is developed on the platforms of HTML, CSS, JQuery, JavaScript, PHP, AJAX. It has different frameworks such as Bootstrap, Font Awesome, MetisMenu, FPDF, Fast click. This Project worked with the MySQL database for the storage part manager, and it was supported by the PSP methodology (Personal Software Process), both tools will allow to create an easy and friendly environment to interact with the user. The Modules that manage the software are Warehouse, Finance, Human Resources, Purchases, Sales, Transportation and Chats Room. The content was developed with the aim of making students' quality practices and thereby strengthening their skills and abilities. In addition to this, the institution will have a low-cost software that can be occupied by the teachers of the Logistics career. Therefore, this type of simulators allow the business processes to be fully automated, the operational, administrative, accounting, financial and fiscal information necessary to carry out an operation cycle, controlling their resources and optimizing their cash flow and working capital.

Control, Software, Administration, Simulator

Sistema web para la gestión de proyectos en la obtención del distintivo empresa familiarmente responsable en las empresas de la Construcción Jalisco

Web system for project management in obtaining the distinctive family-responsible company in Jalisco Construction companies

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Abstract

This article describes the software engineering process for the development of a Web System for project management, within the framework of the academic collaboration agreement between the Universidad Tecnológica de Jalisco (UTJ) and the Cámara Mexicana de la Industria de la Construcción Jalisco (CMIC), through the Consolidated Academic Research Group (CARG) UTJAL-CA-2 Social Responsibility, Sustainability and Integral Development for SMEs. This project contemplates the implementation of two agile methodologies SCRUM and Kanban, which through the practices and their organizational structure allowed to establish the framework of development and appropriate collaboration. This system will contribute to the tasks of any company affiliated with the CMIC that is interested in obtaining the Distintivo Empresa Familiarmente Responsable (DEFER) from the Secretaría de Trabajo y Previsión Social (STPS). Micro, small and medium enterprises (MSMEs) affiliated with the CMIC will be able to systematize their processes through this computer tool, allowing the protection, classification, monitoring and dissemination of the evidence requested in the presentation and evaluation process to which they are submitted. . This will also strengthen their efforts in the adoption of technological processes that make their administrative processes more efficient.

Project management, DEFER, Integral Information System

Desarrollo del sitio web Sisconve con la metodología Scrum

Development of the Sisconve website with the Scrum methodology

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Abstract

The hereby work proposes the development of a web site that allows the tracking of the academic products, wich are a result from the bonding agreements of the Universidad Autonoma de Campeche with other institutions. The web site, generates markers that measure the impact of the agreements with the various educational programs. An analysis about the administration of the software project was carried out emerging as a better alternative the development of the scrum agile methodology, due to the needs of change in all its development processes and stages of planning. Our project poses the three scrum phases, defining the general target and the software architecture design; following a series of sprint cycles for the incremental development of the system, concluding with the required information, as well as feedback from the work team on the lessons learned. The main scrum devices were used: user records, product stacks, task list, making the necessary estimates, calculating the dedication factor based on the estimated speed of our work team.

Scrum Agile Methodology, Software development, Sprint, Website

Docentes y tecnologías de la información y comunicación en el Instituto Tecnológico de Campeche

Teachers and technologies of information and communication at the Technological Institute of Campeche

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Abstract

The Education, especially higher education, in recent years has undergone major changes, one of them is caused by the digital revolution, transforming the educational context into many factors. The Knowledge Society requires that Higher Education Institutions (HEIs) move from a "traditional" educational model to a model marked by the requirements of a community that includes the use of Information and Communication Technologies (ICT) in their contexts and educational processes, that is why, it is important to conduct studies on virtual applications and tools that are known and used by teachers of the Technological National of Mexico, campus: Technological Institute of Campeche, in order to have an idea about what they think and do in their educational practices in relation to ICT This work is an exploratory study to have a first approach and have the relevant information to carry out a training program that meets the needs of teachers

ICT in Education, Educational Applications, Virtual Tools

Implementación de la norma ISO/IEC 29110 de Ingeniería de Software en Instituciones Académicas

Implementation of the ISO/IEC 29110 standard for Software Engineering in Academic Institutions

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Abstract

The present work deals with the implementation of the Software Engineering standard ISO/IEC 29110 at the Technological University of Zacatecas. First, we talk about the experience of the process followed to obtain the certification in its basic profile of the Software Development Center of the institution that endorses the processes of Project Management and Software Implementation. In order to have this certificate and put it in motion our students have the skills to create quality products at the international level that the industry requires. Later we will talk about the advantages of the use of the standard both in subjects of the specialty of Computer Systems and in professional practices of the students of the career of Information and Communication Technologies, commonly called Professional stays. We will also talk about the products developed using the standard and the plans to follow to ensure the continuity of the project. That is, the certification seeks to obtain own resources for the strengthening of the development cell and the career itself, by selling to the public the developed products that will also inherently bring recognition to the outside of the entire university community.

Process, Management, Implementation

Educación con el uso de las tecnologías

Educate with the use of technologies

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Abstract

One of the most important challenges of society is the knowledge acquire through the innovation of educational technology, so it is necessary to implement and also use the modern methodologies of education or educational methods, resources and the educational technology to get new scenarios or virtual environments. By using an educational methodologies it will be possible to achieve different strategies, as well as techniques and educational processes, whose main objective is to facilitate the learning and the creation of knowledge on students and teachers of higher education. The knowledge within the educational field, is observed the evaluation of the teaching performance inside the classroom, to encourage the teaching learning in the competences of the teachers, emphasizing the educational process as a reflection of the achievements that is complete in the classroom. The content must be innovative taking into account the diagnostic analysis, the didactic planning, the evaluation in competencies and a plan of continuous improvement. Teachers must emigrate to the technological means to understand what is changing in the knowledge society and that we must transform into the classroom, taking into account the activities, the dynamics of the technological tools that Interact with the teacher and the student.

Educational technology, Knowledge, Virtual environments

Desarrollo de un sitio web mediante Scrum, para la integración de producción académica

Development of a web site through Scrum, for the integration of academic production

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Abstract

Projects in software development have sudden changes by customers or users, this has caused that increasingly are applied agile methodologies for the development of a software project, in this work the process of how a site was developed is presented web for a public university that requires integrating information about the academic products of teachers. The methodology used allowed to integrate a work team, where the person in charge of the research area of the institution was part of the development of the project, the environment that was generated in the work team was motivated among the collaborators, using effective methods of communication such as they are face-to-face meetings in short times, where short cycles are generated that are commonly called iterations but which Scrum calls them Sprints. A cycle has 5 phases, Concept, Speculation, Exploration, Review, and Closing these last allowed changes that managed to deliver the desired product. The team of developers organized and made decisions that allowed to test the site with the research professors that even though they were not part of the Scrum process, they were part of the feedback of the process output that allowed to plan the Sprints.

Scrum, Academic Products, Agile methodologies

La capacitación en línea: Una modalidad para el personal docente del ITO

On-line training: An ITO faculty modality

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Abstract

The Information and Communication Technologies (ICT) and the Technologies for learning and knowledge (TAC) constitute the cultural and technological event of greater scope at present. From the pedagogical point of view, the introduction of ICT, TAC and the creation of Virtual Learning Environments (AVA) in educational institutions necessarily generate transformations in teaching and learning processes, breaking the space-time barriers. The Technological Institute of Oaxaca, does not escape such a process of globalization of information and knowledge, and through the Department of Systems and Computing proposes a personalized online training platform, whose objective is to promote the professor professional development through the offer of permanent and, virtual training courses. The developed software contains tools and resources in order to develop skills about information handling and collaboration and communication tools, this allows each professor learning to his/her own rhythm; the software development was made using the extreme programming agile model.

Virtual learning environment, Professor training, Courses

Beneficios de la tecnología para lograr la productividad en el aula

Benefits of technology to achieve productivity in the classroom

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Abstract

Every educational institution has instruments to achieve productivity in the classroom, in this case technology has become a relevant ally for education, it is necessary to analyze those activities carried out by teachers and the role of the student in terms of the use of cell phones for academic activities. The main objective is to show those existing tools that can be used to achieve greater use in the classroom, the important thing is that they have knowledge of them. For the elaboration of this research, it is intended to perform under the qualitative approach, where the phenomenon of study is observed in its original content, that is, to the students, specifically in the area of accounting (CU) of the Autonomous University of the State of Mexico (UAEM) University Center of the Municipality of Valle de Chalco, is the study of those elements that can be used in the classroom, such as interactive whiteboards, virtual classrooms, among others, which have been integrated into the institutions of education. It is necessary to see how social networks encourage students because it allows them to interact interactively with their classmates. The main contribution is the presentation of those tools that can be used in the Teaching-Learning process, (E-A) within the university.

Teaching-Learning Process, Education, Technology, Teacher, Student

Software de Optimización de Redes Neuronales Artificiales (SORNA) para neurocontroladores en un sistema de control

Optimization Software for Artificial Neural Networks (SORNA) for Neurocontrollers in Control Systems

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Abstract

Feedback control systems are used in engineering field to automatize processes. This sub-field of engineering is named control engineering. The most popular tool to design and analyze control systems is linear control and its techniques. But these are difficult to manage when systems have more than one input or output, or where systems are not linear. Thus, Intelligent Control is an important option when system is difficult to design or analyze whit classical control theory. Artificial Neural Networks are an important tool for Intelligent Control Systems and are recommended when systems have many inputs and outputs, but especially when systems are complex to model. For that reason, we developed a tool that optimize ANNs which are used as a controller in control systems. SORNA was developed with C++ and Matlab programming languages and used a generational Genetic Algorithm and data bases to optimize the synaptic weights of neuro-controller. Also calculates an equivalent of a proportional controller for artificial neural networks. Our software was tested with open access data bases related.

Intelligent Control, Artificial Neural Networks, Genetic Algorithms

Comparación en la respuesta de los métodos de sintonización de la curva de reacción de Ziegler-Nichols y optimización computacional aplicados al control de un robot tipo SCARA

Comparison in the response of the tuning methods of the Ziegler-Nichols reaction curve and computational optimization applied to the control of a SCARA type robot

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Abstract

The present work shows the results obtained during the operation of a robotic arm in SCARA configuration. To obtain the transference function of the joint systems, the MATLAB software was used, based on an analysis of the feedback data given; applying to the determined models, the method of tuning the Ziegler-Nichols reaction curve for the establishment of the gain values of each PID controller used, which was applied in the manipulation of each joint of the robot. The results show a percentage lower than 2% of error in the final positioning of each articulation with respect to the requested value, for which the use of the computational optimization method is also proposed to obtain more efficient gain values in the controllers used for each system, with a percentage of 0.1% error; this with the purpose of granting and maintaining an adequate stability of the total robotic system.

SCARA Robot, Ziegler-Nichols tuning, Computational optimization

Reingeniería del Controlador de un Brazo Robótico de 6 g.d.l

Re-engineering of a robotics controller arm of a 6 dof

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Abstract

This paper details the construction of a classic control, proportional integral and derivative (PID), that made the tracking of a simple trajectory, thanks to a power electric circuit that rehab an industrial robotic arm of 6 degree of freedom (dof). We must to say that the kinematic and dynamics models are validate by experimental tests, checking the versality of use an open control scheme instead of an industrial. The goal of this paper is to rehab an industrial robotic arm without the industrial control scheme, desingning for that an electric power and an own graphic interface.

Re-engineering, Controller, PID, GUI, tuning

Diseño, simulación y control de trituradora de papel

Design, simulation and control of paper crusher

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Abstract

The design, simulation and control for the construction of a paper crusher prototype that meets performance, quality and safety standards is developed. In order to solve the dead archive problems that exist in government agencies and educational institutions. Because they can not throw their documents in the trash for containing confidential data and according to the rules of the organization. The advantages of the development of this prototype over the market are economic and operational, considering a mechanical gear system, since existing ones with similar characteristics are more expensive, in addition to meeting the needs of crushing with quality and efficiency because his analysis establishes the materials specifically to perform paper crushing; security, since it contains elements that restrict the operator during the function and guarantees the reliability to avoid accidents. The materials, the mechanics of materials, the design conditions with the structural simulations, dynamics are analyzed, in addition to obtaining the operating parameters. The system of the industrial paper shredder is composed of blades, bearings, power transmission mechanisms, couplings, motor, banking, controllers, wiring and covers.

Design, Simulation, Control, Crusher

Diseño, construcción e implementación de una prótesis de mano mecánica

Design, construction and implementation of a mechanical hand prosthesis

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Abstract

One of the main problems of people who lack an upper limb due to a congenital disability or amputation, it is not having enough money to acquire a prosthesis that can help them to perform some everyday tasks. For this reason, in this work the design, analysis and construction of the prototype of a mechanical prosthetic hand is carried out. The prosthesis has five fingers that have capacity for movement and grip by means of artificial tendons, also have a clamping element for ensure the prototype to the patient. The build of the prototype is done by means of a 3D printer, thus allowing lower costs of production, as well as decrease their weight since the materials used are plastics ABS, PLA and TPU. The final results show the final prototype assembly, the cost analysis and, furthermore, its implementation in a 5 year old child suffering from meromelia, demonstrating the ease of use and adaptation with the proposed design

Design, Hand prosthesis, Implementation

Control de un robot cilíndrico

Cylindrical robot control

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Abstract

In this paper it's revealed how currently the use of robotics and specifically the configurations of robotic arms have reached an important impact in diverse areas of application. The cylindrical robot configuration offers versatility due to the work area. For this direct kinematics, tuning and control of this configuration is developed with the aim of achieving greater efficiency and response in the displacements of each of the joints, the tuning of control gains is made using the Ziegler- Nichols method to reduce the margin of error when the final position is reached; with the assistance of the LABVIEW software, the encoder data corresponding to the feedback of the displacement of each of the joints of the robot are obtained for storage and the data are imported using the MATLAB software to be processed and obtain the characteristic model of the behavior of the system, followed by applying the tuning method to calculate the gains, whose values are designated to the control stage where a Proportional, Integral and Derivative (PID) controller is used.

Cylindrical robot, Direct kinematics, Tuning

Equipo para el proceso de hidrólisis enzimática del almidón de papa a escala piloto

Equipment for the enzymatic process for hydrolysis of potato starch to pilot scale

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Abstract

The cultivation and processing of potatoes generates a large number of tubers that do not meet the market quality requirements. These tubers can be used as raw material for the preparation of food honeys or glucosed syrups that are used in fermentations. Therefore, it is necessary to develop processes and equipment for its use. The objective of this work is to develop a 100 L pilot equipment for the production of glucosed syrups of potato starch through the process of enzymatic hydrolysis. For this purpose, a stainless steel tank with mechanical agitation was designed and built, adapted to a 1 HP electric motor by means of a gearmotor, a monitored gas burner with an optical sensor and a stirring and temperature control system through a PLC. For the tests of operation of the equipment, residues of potato tubers collected in a local packing plant were used. The extraction and enzymatic hydrolysis of the starch was carried out. The developed equipment operated properly for the hydrolysis of high concentration starch suspensions and it was possible to obtain syrups of more than 500 g / L of sugar concentration

Enzymatic Hydrolysis, Starch, Equipment

Techo verde como elemento reductor de transferencia de calor en clima cálido seco extremo

Green roof as a heat transfer reducing element in extreme dry hot weather

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Abstract

The green roof in warm and dry weather helps to reduce heat gain generated by the solar radiation in summer, which causes temperatures exceeding the thermal comfort zone for interiors in warm dry weather. Determine the parameters of temperature are presented according to the type of roof is important for improving the architectural design. Two models were analyzed, the first green roof and the second with concrete roof and polystyrene for insulation, which are monitored internal temperatures and underwent a statistical analysis to determine the potential for reducing indoor temperature respect to outdoor temperature. For thermal monitoring used to instruments for measure temperatures with a reliability of $\pm 0.1^{\circ}\text{C}$. Sensors were placed and held the record data according to the rules C1046-95 and C1153-97 from the American Society for Testing and Materials (ASTM). We performed data analysis with the t test method. There was a significant difference between the environment and the green roof module. The data collected showed that with a green roof temperatures lower than 36% can be obtained that the environment.

Green roof, Thermal performance, Test module

Elaboración y caracterización físico-química de biodiesel a partir de aceite de girasol utilizando un reactor modelo DL BIO30

Elaboration and physical-chemical characterization of biodiesel from sunflower oil using a model reactor DL BIO30

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Abstract

Present work shows the results of investigation about the biodiesel obtaining from new sunflower oil using a semiautomatized reactor model DL BIO30 with 30 liters capacity, this reactor is specialized for biodiesel production. The transesterification method was used to the biodiesel production and the quantities of reagents used in the production of biofuel are indicated. Some of the physicochemical parameters of biodiesel were characterized, such as density, viscosity, boiling point, flash point, acid index and also were compared with the established standard in the ASTM D6751-8 which refers to the performance and parameters that guarantee the quality and behavior of biofuel. It was determined the development of a methodology for the manufacture of biodiesel, quantities of reagents used in a process for 10 liters of sunflower oil and efficiency obtained of 80% biodiesel- 20% glycerin, and measured properties such as PH, density, point of flammability and viscosity for fuel 100% biodiesel.

Biofuel, Reactor, Transesterification, Physicochemical Parameters

Desarrollo de prototipo de maquina desespinaadora de nopal verdura

Development of nopal vegetable despining machine prototype

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Abstract

The present research project aimed, to design and build a prototype of a vegetable nopal desespinaadora machine. The prototype is structured in the form of a square table of 1` caliber 18, it has 1 Roller made with an arrow of 7/8 fixed with braces and a pulley, the roller carries some screens that will perform, the process of desspinado manipulated with a motor of 1/4 of hp, in low power. It has 2 rollers that will support the weight of the cactus so that it passes through the flat blade and the thorns are eliminated. It will be turned over manually and returned by the first step to remove the spines on both sides, on the same bar has the space to perform the third step which works in the same way with a vertical roller that is subject to an engine will be fixed to the base of the structure, its function will be to remove the spine from the contour of the nopal, the product without spine will pass to a container for storage. This ptototype was designed with accessible materials and low cost, the manipulation is easy and safe for the operators so that the producers obtain a quality product and improve their income.

Machine, Vegetable prickly pear, design, Manufacturing

Diseño y fabricación de un sistema integral para el reciclado de polipropileno para la creación de nuevos productos

Design and fabrication of an integral system for the recycling of polypropylene for the creation of new products

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Abstract

The objective of this research is the design and fabrication of a polypropylene recycling system that consists of crushing machines, washing and extruders as an alternative for the manufacturing of filaments of 3D printers and moldable parts, using polypropylene obtained by crushing processed products from this plastic. The extruder is formed by spindle, alimentacion camera, nozzle, hopper, piston, control panel and venturi tube. For the crusher, three-phase motor reducer, stainless steel blades, control panel for the motor, container, hopper, guard. However in the washing machine contains worm screw, guard, PLC board, stainless steel tub, hydraulic system and electrovalves. Nevertheless was made in two parts the mechanics which consists of the construction of all the elements of the machine and the electronics. Though the control of the mechanical part and the extrusion temperature is carried out by means of electrical band resistors manipulated by a temperature controller as well as the selection of the cooling system at the output of the extruder. The extrusion temperature of 280-300°C, motor of 1hp, speed of rotation of the spindle 35 rpm, with adjustment capacity by electronic means of 2 mm in diameter and variable with interchangeable nozzle.

Extruder, Polypropylene, Recycling

Análisis de las técnicas de estabilización del ángulo de inclinación y rotación de un monóptero con aplicaciones industriales

Analysis of the stabilization techniques for rotation and inclination angles of a monocopter with industrial applications

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Abstract

This paper proposes the design and analysis of P-I-D control techniques for the stabilization of the angle of inclination and rotation of a monocopter. The project is divided into three phases: The first is the mechatronic design of the prototype (plant). The second phase is the mathematical modeling of the system and the proposal of the control techniques. The third is the analysis of the results of the prototype behavior before disturbances. The response given by the system with proposed control techniques constitutes the main contribution of this article. Mathematical and physical modeling of the prototype is simulated using V-REALM® and control techniques are obtained from SIMULINK®, both MATLAB's® tools. The objective is to establish a dynamic that allows to evaluate the relevance of the different control techniques applied in the system. The project is oriented towards a didactic use in the formation of university students interested in Control theory. This project is part of a more extensive work still under development, which includes the use of control techniques for dynamic systems with applications in the renewable energy industry such as wind turbines and tidal generators.

PID control techniques analysis, Monocopter, Renewable energies

Herramienta de optimización aplicada a la cadena de suministro en el Sector industrial automotriz

Optimization tool applied to the supply chain in the automotive industrial sector

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Abstract

This paper we present the results obtained from design and implementation of a Kaizen event in an automotive manufacturing industry, which uses a metric called OEE for its acronym in English "Overall Equipment Effectiveness" as indicator to measure the efficiency of industrial equipment. This indicator is used as a key tool and vital importance within the culture of continuous improvement. In this company, the OEE metric is being affected by the downtime of each production line and the work stations caused by the lack of material. In the Toyota Production System (TPS), the excessive waiting time is a waste, which must be effectively reduced to increase the profitability of the company. The Kaizen event was developed, formed by a multidisciplinary team, which was worked on for five days in the proposals, analysis and obtaining results, which were presented to the management until the optimal results were achieved, which were reflected in the OEE and the waste that affects the processes was reduced, as established in the theory of Lean Manufacturing.

OEE, Kaizen, Lean Manufacturing

Implementación de un sistema de reconocimiento de imágenes para detección de errores de procesos en la Industria

Implementation of an image recognition system for the detection of process errors in the Industry

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Abstract

Today, automation of processes has become a priority in the industry because it reduces errors and therefore, costs. At industry, pieces of complex shapes are manufactured, a process that makes it necessary that, one or more people supervise the process, to avoid errors that affect or reduce the quality of the final product. Despite these efforts, human errors can cause problems in future stages of the process. Therefore we propose the implementation of an image recognition application that allows people to detect each piece for errors, this way you can see if they contain malformations, cracks, deterioration, fractures, among others; using the reading of the contour and patterns that are formed in pieces, and warns you if the piece does not meet determined standard, to allow discarding them. The system has been tested with different shapes and they have been able to detect even small spots that should not be there.

Images Recognition, Process, Industry

Optimización de la sacarificación de productos amiláceos para la producción de bioetanol

Optimization of the saccharification of starchy products for the production of Bioetanol

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Abstract

In order to proposing a process for the production of bioethanol from starchy substrate, in this work the hydrolysis and saccharification of potato starch was optimized by using an *Aspergillus niger* strain. A response surface arrangement was used, in which the independent variables were pH (4 and 5), temperature (25 ° C and 35 ° C) and agitation speed (200 rpm and 300 rpm). The experiments were carried out at a 1 L flask scale with 250 mL of potato flour suspensions (100 g flour / L) supplemented with mineral medium and suspensions of *A. niger* spores of 1 X 10E05 spores / mL. The experiments were performed in duplicate. The response variable was concentration of reducing sugars measured by spectrophotometry. The main contribution was a statistical model that optimizes the yield of reducing sugars with respect to the substrate, where interaction of temperature (35°C) and agitation speed (200 rpm) have a positive effect on reducing sugar productivity (1.71 g/L/h)

Bioethanol, Saccharification, Optimization

Plataforma experimental de bajo costo para el control desacoplado de un robot manipulador de 5 GDL

Low cost experimental platform for decoupled control from a 5 DoF manipulator robot

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Abstract

In this article, a low-cost experimental platform for the uncoupled control of the joints of a 5 DoF manipulator robot is presented. The joints are actuated by means of six direct current motors, each coupled to an optical decoder to detect its position and feedback to the controller. In order to achieve a balance between the desired hardware efficiency and its low cost, in the design and implementation of the acquisition stage of the optical decoder signals of each of the motors, only two Arduino MEGA cards are used; for control of the movement set of the manipulator, the programming routines are based on Matlab-Simulink; and finally, the Arduino cards communicate in real time with Simulink through the toolbox ARDUINO IO of Matlab-Simulink. The experimental platform allows a precise control in the movements of the manipulator, to corroborate it, the results of the experiments are presented that allowed to verify the good performance of said platform.

Decoupled Control, Manipulator Robot, Experimental Platform

Tratamiento de aguas residuales provenientes de la industria de la curtiduría mediante un sistema biológico aerobio fijo empleando como soporte polietileno de alta densidad

Treatment of wastewater from the tannery industry through a fixed aerobic biological system using high-density polyethylene as support

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Abstract

This research is aimed at the treatment of wastewater from the tannery industry. To carry out this treatment, a rectangular glass, aerobic reactor, with a capacity of 16 L was used, a high density polyethylene (HDPE) was used as a support medium, with a specific surface of contact (Se) of 63.3 m²/m³, for the growth of microorganisms and promote the development of biofilm in the support medium, residual water of sanitary origin (RWS) was used, subsequently the treated water was evaluated obtaining removal efficiencies of 81% of the turbidity, 46% of color and 65% of the Chemical Oxygen Demand (COD) in eight hours of treatment. For the adaptation of the microorganisms to the water of the tannery process (RTW), the experiment was carried out adding a mixture of RWS with RTW both at a pH of 8, the proportions that were used were the following: 20% -80%, 23 % -77%, 30% -70%, 40% -60% and 50% -50%, sanitary water and tannery process water respectively. Upon reaching the last adaptation an increase in turbidity and color was observed, however, a 65.5% removal of the COD was obtained.

High density polyethylene (HDPE), Biofilm, Chromium

Biodegradación de hidrocarburos fracción pesada en un suelo contaminado utilizando composteo con biosólidos de aguas residuales y nopal (*Opuntia ficus indica*)

Biodegradation of heavy fraction hydrocarbons in a contaminated soil by composting with biosolids from wastewater and prickly pear cactus (*Opuntia ficus indica*)

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Abstract

We studied the biodegradation of soil contaminated with heavy fraction hydrocarbons (HFH) in high (19,400 mg/kg) and median (11,700 mg/kg) concentration using composting with two different co-substrates: cladodes of prickly pear cactus (*Opuntia ficus indica*) and biosolids from a wastewater treatment plant, and also garden trimmings as volume agents. Soil had a population of hydrocarbonoclast microorganisms, developed from weathering for more than a year. Biopiles with aeration every seven days, 21 to 32% humidity and 20-C/N rate, were set. The biopile with soil of high HFH concentration, mixed with biosolids presented the highest removal efficiency (44.96%), with a final concentration in the soil of 5,221.26 mg HFH/kg, dry basis, within 12 weeks of experimentation, reaching the maximum permissible limit (MPL) set by NOM-138-SEMARNAT/SSA1-2012 official Mexican regulation, for industrial land (6,000 mg/kg, dry basis). The removal in other biopiles was from 22.33 to 36.98%. The best degradation rate was close to 410 ppm of HFH/day, during the first 15 days of treatment. It was also observed that in the biopile of median concentration of HFH soil, mixed with biosolids reached the mentioned MPL in 10 weeks.

Heavy fraction: Hydrocarbons, Soil composting, Biosolids, Prickly pear cactus

Construcción de un prototipo de biodigestor anaerobio para el tratamiento de aguas residuales

Construction of an Anaerobic Biodigester prototype for Wastewater Treatment

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Abstract

The objective of this study was to build a 20-liter anaerobic biodigester prototype for wastewater treatment. For the construction, sanitary PVC pipes of 4 inches of nominal diameter and 120 cm in length were used, which make up the body of the biodigester. Sampling ports were placed at 40 and 80 cm from the base to insert thermocouples for temperature measurement. A sanitary PVC cover was placed with a latex tube to collect the generated biogas. An external coil connected to a recirculating bath and a glass wool jacket for temperature control was installed in the equipment, which was measured in line with a thermocouple. Anaerobic sludge was used from a facultative lagoon of swine farms, which were fed with residual water from the Town of Libertad of the Municipality of Perote, Veracruz. The efficiency of the treatment was obtained by measuring COD to the input and output residual. The results obtained show the production of biogas and reduction of the organic load of the residual, with the consequent decrease in the chemical oxygen demand (COD).

Biodigester, Thermocouples, Biogas

Determinación experimental de coeficientes de transferencia de calor de un evaporador helicoidal

Experimental determination of heat transfer coefficients of a helicoidal evaporator

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Abstract

Experimental tests were designed, characterized and carried out to determine the heat transfer coefficients of a helical evaporator, with the purpose of being adapted to an absorption machine. The proposed internal design includes 7 concentric helical coils, nested in a rigid shell, connected in parallel through a manifold, which distributes the service fluid into the coils. On the outside, the supply of the working fluid is carried out by means of a drop distributor (shower) with the aim of forming an uniform falling film on the tubes. The construction material is 304 stainless steel to prolong its useful life. 36 experimental tests were carried out using water as a working and service fluid, at 6 different temperatures and 6 supply flows from the source. The results show that the overall heat transfer coefficient is between 574 and 1352 W/m² °C. While the convective heat transfer coefficient is between 661 and 1650 W/m² °C. These values are higher than those reported in the literature for conventional evaporators, which shows that the helical evaporator has a better heat transfer performance.

Helical evaporator, Falling film, Absorption machine

Análisis del desempeño higrotérmico de cava de vino subterránea

Analysis of thermal performance of underground wine cellar

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Abstract

Temperature control is fundamental for the aging of wine, which requires more time of use of electromechanical systems for interior cooling and humidification that increases the operative cost of wine cellars. The underground buildings represent a constructive solution to maximize the thermal performance and energy efficiency, by using the thermophysical properties of the subsoil for the reduction of the interior temperature, however, this effect depends on the characteristics of the building and the study site. The main objective of the present work was to analyze the hygrothermal performance of an underground wine cellar in Guadalupe Valley Mexico, using data of dry bulb temperature and relative humidity monitored for 1 year. The conditions of the external microclimate were measured asynchronously with a weather station. For the analysis, theoretical ranges of optimum temperature and humidity for wine aging are considered, based on literature of leading authors. The results show the effect of the subsoil and the meteorological variations of the exterior on the interior conditions for the cold period (December to February) and the warm period (June to September).

Hygrothermal monitoring, Wine cellar, Hygrothermal performance

Análisis experimental de una bomba de calor aire-agua que opera en una alberca pública en condiciones invernales

Experimental analysis of a heat pump air-water which operates at a public pool in a position to overwinter them

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Abstract

This work analyzes the behavior of an air-water type heat pump, which provides the necessary heat for raising the temperature of water from a public pool in winter conditions. The studied pool is located in the area close to the Autonomous Metropolitan University; it is of Olympic dimensions (50 m-long, 25 m-wide and 1.50 m-deep). Since these are public premises, they operate on a schedule from 6:00 to 21:00 a.m. six days a week. The water temperature should be 28 °C throughout the operation time and the heat required by the water is supplied by means of an 18 heat-pumps system, intermittently working. The system was evaluated in the periods comprehending December to March of the years 2016, 2017, and 2018. Heat pumps should deliver on average 180 kW of heat into the water to keep the pool in the required operation conditions. The operation performance coefficient (COP) of heat pumps was 4.5 between 6:00-10:00 h, during february. The average value in the 13:00-15:00 h. period was 5.8. For the evening period between 19:00-21:00 h the average value was 5.2. These values differ from those obtained for other seasons of the year and are far away from the value of 7.0 reported by manufacturer for this time of the year.

Heat pump, COP, heat pump air water, winter season

Análisis y modelado de motores tipo HCCI usando biocombustibles

Analysis and modeling of HCCI type engines using biofuels

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Abstract

This research paper describes the importance of the internal combustion engine of homogeneous charge ignited by compression (HCCI), its energy efficiency associated with a lower generation of pollutants, as well as its modeling and numerical simulation for the process of ignition of mixtures of propanol / air and n-butanol / air. One of the objectives of this research is to apply reduced reaction mechanisms of these fuel mixtures to later test their effectiveness by implementing them in software based on the finite element method. The use of reduced mechanisms instead of detailed fuel mechanisms will allow future more complex simulations of HCCI-type engines to be carried out without requiring such sophisticated computer equipment. For the numerical model, mass and energy equations with heat generation due to ignition were included. The results of the simulation show that the auto-ignition of the mixture depends on its temperature of entrance to the combustion chamber.

Objectives: Obtain a reduced mechanism por biofuel for its use on engine modeling.

Metodology: Computational analysis

Contribution: Sustainable energy

HCCI engines, Energy efficiency, Pollution control

Análisis de un banco de pruebas para microgeneración hidráulica

Analysis to a test bench for micro-hydro-generation

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Abstract

Hydroelectric microgeneration is one of the energy solutions in isolated areas or with zero access to the distribution of electrical energy. The objective of this paper is to present analysis methodology for a hydraulic test bench with a Michell Banki turbine, based on design considerations proposed by Bilal Abdullah for a hydroelectric generation plant. This investigation details the analysis of a specific test bench that operates in jump conditions of 20 and 30 meters of flow height respectively, for a Michell Banki turbine of transverse flow installed in the base of the test bench that works in conditions of flow from 4.75 to 16.27 l / min in which for flow considerations and a new design scheme is proposed which includes the evaluation of the available flow and the specific mathematical models for the Michel Banki turbine under specific operating conditions.

Hydraulic, Methodology, Analysis

Diseño de un algoritmo para la evaluación económico-energética de captadores solares

Design of an algorithm for the economic energy evaluation of solar collectors

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Abstract

The performance of solar collectors depends mainly on the regions where they are installed, due to this, in order to be tested correctly, the NMX-ES-004-NORMEX-201 standard was developed, where the criteria and necessary conditions that determine the curves of day and night performance in a solar collector are indicated. The present work shows the development of an algorithm, programmed in C language, which by means of the yield curves performs an energetic and economic analysis of a solar collector. The present work shows the development of an algorithm, programmed in C language, which by means of the yield curves performs an energetic and economic analysis of a solar collector. in the energy analysis the algorithm determines the monthly and annual energy demand in a house, as well as the energy supplied by the sun and by the backup system (boiler). with the results of the analysis, the savings in fuel and the CO₂ emissions that are not emitted to the environment due to the use of the solar collector are calculated. Likewise, the algorithm uses the calculation of fuel savings to determine the annual economic impact during the life of the system calculated the net present value over a period of ten years, the internal rate of return and the time of recovery of the investment.

Solar collector, Performance curves, Auxiliary system, Return of investment

Automatización de un deshidratador solar para frutas y hortalizas

Automation of solar fruit and vegetable dehydrator

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Abstract

The article describes an innovative process in the automation of solar fruit and vegetable dehydrator. The process of dehydration consists of removing the water found in the tissues of the product, preventing the bacteria from developing in the absence of moisture and therefore, achieving characteristics that allow handling and preservation, ensuring the final quality to the consumer. The automation consisted of adjusting and controlling the environmental conditions in which the dehydrator operates, in order to offer advantages in the production, in order to monitor the time, humidity and the necessary temperature, thus achieving a properly dehydrated product; that automation was implemented through a Raspberry Pi board, which gathers information from different sensors to operate actuators that open vents, activate both fans and moisture extractors, achieving ideal conditions in dehydration, a Web interface was developed to monitor and manipulate the elements of the dehydrator. With the development of the prototype described, the bases are established for the implementation of real operating conditions optimizing the use of solar energy.

Automation, Web Application, Dehydrator, Raspberry pi.

Dinámica de una Nube de Gotas de Agua para la Generación de Energía Eléctrica

Dynamics of a Cloud of Drops of Water for the Generation of Electric Energy

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Abstract

In this work, the dynamics of water droplet clouds in confinement is considered, with the interest of contributing to the understanding of some physical processes that occur in Energy Towers. The study includes the analysis of the dynamics of an artificially created cloud of drops. In principle, our results would offer useful information to make a better design of Energy Towers. The small drops of water are mixed forming a cloud of confining droplets, the process is similar to smaller scales of entrainment and mixing of real clouds. The optical technique of Particle Imaging Velocimetry (PIV) is applied to the images obtained from the experiments in the laboratory, to investigate the dynamics of the process in mm scales. Two components of horizontal and vertical velocity recovered in the image processing indicate anisotropy of small-scale turbulent movements, with preferred direction in the vertical when in the variant 1, and in the horizontal when it is the variant 2. These results also they verify that the effect of the cylindrical wall on the dynamics of the turbulent flow in the cloud of drops, is the restriction of the vertical component.

Cloud of water droplets, Energy towers, Taylor micro-scale

Comparativa costo-beneficio de sistema fotovoltaico fijo y con seguidor solar de un eje

Cost-benefit comparison of fixed photovoltaic system and a single-axis solar tracker photovoltaic system

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Abstract

Technology is advancing in electric generation using alternative energies such as photovoltaic solar systems; in order it reduce the use of fossil fuels that are not environmentally friendly. Photovoltaic (PV) systems allow the generation of electricity through the use of solar radiation, becoming an alternative for applications that require electricity. A problem faced by a PV system is a low efficiency for fixed installations because despite considering the right inclination depending on the site of installation it receives less than 50% of the total annual radiation and it is required to install more PV modules in order to generate the required power by the user, leading in an increase of the cost of these systems. Solar trackers are devices that increase the energy generated by a photovoltaic array, improving efficiency but requires energy consumption and a high initial investment. Therefore, the solar tracker is an opportunity to reduce energy losses; however, they are only feasible in medium and large scale projects. This work presents a cost-benefit analysis based on the power generation of a fixed PV system and one with a solar tracker of one axis.

Photovoltaic solar systems, Solar tracker, Renewable energy

Estudio de la modificación de la presión de recalentamiento de una central térmica de vapor de 350 MW, para mejorar el rendimiento térmico del ciclo en condiciones reales

Study of the modification of the reheating pressure of a steam thermal plant of 350 MW, to improve the thermal efficiency of the cycle in real conditions

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Abstract

The analysis of the modification of the reheating pressure of the Villa de Reyes thermal power plant was presented. A simulation model was developed for the behavior of the steam thermal cycle, including the thermal analysis of the combustion chamber, the heat transfer in the steam generator, and the mass and energy balance of the reheat and regenerative Rankine thermodynamic cycle under which the plant operates, the results were validated against the operating data set by the manufacturer. A sensitivity analysis of the effect of the main operating variables on the total cycle efficiency, using the technique of energy and exergetic analysis, was performed, by modifying the superheating vapor pressure and setting it to 19% with respect to the Main vapor pressure, an increase of 2.37 MW of useful work is achieved, for the 100% load operation regime. It was determined that the maximum energy and exergetic efficiencies of the cycle are achieved at high load regimes of the thermal power station and establishing the superheated steam pressure in a range of 5% - 20% with respect to the main vapor pressure.

Exergy and energy analysis, Thermoelectric power plant, Rankine cycle

Implementación de un módulo de validación de acciones seguras para navegación de robots de servicio

Safe actions module implementation for service robots navigation

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Abstract

The design of autonomous navigation systems for service robots which move near people requires an adequate balance between response time and safety for both humans and robots. Particularly, it is needed a mechanism to decide which strategy is the best according to a safety criterion. This article reviews different safety approaches appearing in the mobile robotics literature and describes the implementation of the software module PICS-DW which assigns a safety value to the possible navigation actions of a robot according to the concept of probabilistic inevitable collision states. The set of navigation actions are organized according to a Dynamic Window and are dependent on the structure of the robot. The module was developed using C++ language according to the framework of the Middleware ROS (Robot Operating System) and was tested on the robot simulation platform MORSE. The results show that the proposed method choose navigation paths which avoid risk zones around humans. Due to the modular nature of the system and its Open Source License the present prototype can be used by the community to test new safe navigation strategies.

Autonomous navigation, Service robots, Computational robotics

La Calibración para el aseguramiento de la calidad de datos PM₁₀ y PM_{2.5} en el monitoreo de la calidad del aire

Calibration for the assurance of data quality PM₁₀ and PM_{2.5} in the monitoring of air quality

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Abstract

Given the importance of the problem of air pollution worldwide, it is required that monitoring systems generate quality data. This paper is focused on verifying and ensuring the quality of the raw data obtained by the air quality booth installed in the TecNM/Instituto Tecnológico de Nogales (ITN), at order to define a series of steps as well as the equipment required for calibration based on airflow and leak detection of samplers for PM₁₀ and PM_{2.5} particulate pollutants; the calibrations that fulfilled the requirements ensure that the data obtained from the previous calibration were valid and comply with current Mexican standards for raw data. The following results were obtained, monitored from June 26, 2016 to June 29, 2017 with 13 calibrations performed, PM₁₀ passed all calibrations performed, PM_{2.5} only passed 5 calibrations. The robustness of the valid data will serve to continue with the cleaning and validation process, as well as the application of data mining algorithms.

Raw data, Calibration, Contaminants, Valid data

Aplicación de eficiencia energética para optimizar el Sistema de Iluminación en una Institución de Nivel Superior

Application of energy efficiency to optimize the Lighting System in a Higher Level Institution

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Abstract

In this article a study is developed with the aim of optimizing the interior and exterior lighting system of the Engineering Faculty of the Universidad Autonoma de Campeche to obtain lighting levels that comply with the standard NOM-025-STPS-2008 and that provides safety conditions to people who use low voltage electrical installations. A system based on home automation is designed through motion and time-type sensors in building B of the Engineering Faculty of the Universidad Autonoma de Campeche and in the exterior lighting peripheral to this building. In addition, the lighting levels in the various areas is performed to verify if it complies with the regulations and the areas that do not comply are redesigned. With this methodology an alternative that provides maximum visual comfort and the highest system performance to achieve real savings of electricity is created. This pilot study is the basis for implementing an optimization model of lighting systems for Higher Education Institutions.

Optimize, Lighting system, Home automation

Estudio de los caudales del río Huazuntlán para el aprovechamiento del potencial minihidráulico para el auto-abastecimiento

Study of the flows of the Huazuntlán River for the use of the mini-hydraulic potential for self-supply

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Abstract

The "Sierra de Santa Marta" (Santa Marta Mountains), which is part of the biosphere of the Tuxtlas in the South of Veracruz, is an intercultural region that is rich in natural resources, but in conditions of poverty and marginalization. For this reason, it is important to carry out actions that adequately take advantage of existing natural resources, such as renewable energies. In particular, this region has a very important water resource, which supplies more than 600,000 inhabitants of the most important towns in southern Veracruz. However, few studies have been carried out in this area to establish the feasibility of using the hydric and specially the minihydraulic potential. Given this motivation, in the present work the flows are estimated remotely throughout the year for the Huazuntlán River, which is one of the most important in this hydrographic basin. Based on the characterization of the different points, the mini-hydraulic potential for the generation of electrical energy can be estimated.

Minihidro, Renewable energies, Tuxtlas mountains

Estudio del contexto de la especie capsicum chinense en el municipio de Centro del estado de Tabasco, para la generación de una propuesta de desarrollo

Study of the context of the capsicum chinense species in the municipality of the Center of the State of Tabasco, for the generation of a development proposal

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Abstract

The chinense capsicum is one of the five domesticated species of chili peppers. Among its varieties is Habanero pepper (capsicum chinense Jacq.), the most common. At the moment the chinense capsicum is very prized for the export due to its high content of capsaicina, that is the substance that provides the spicy flavor, according to the scale Scoville that measures the pungency of the chilies. The present study is a research work that aims to analyze the evolution of the cultivation of the capsicum chinense species in the municipality of Centro of the state of Tabasco, so that deficiencies in the productive system currently implemented by small producers can be identified. that prevents the reach of the desired quality in your crops; as well as detecting the specific factors derived from the context variables that impact the primary sector in a direct and significant way, with the aim of designing and proposing a model for the optimal development of said sector, which allows obtaining productivity in the primary sector, and likewise an opportunity to be competitive in a globalized sector.

Capsicum chinense, Competitiveness, Comprehensive approach

Caracterización del viento de Ciudad del Carmen, Campeche

Carmen City's wind characterization in Campeche

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Abstract

The wind is considered as a mass of flow moving respecting to earth surface. The global atmosphere transports air masses due to differential thermal potentials, powered by the sun. The water latent heat when changing from a phase to another has more influence in the weather. The wind energy available varies according to the seasons of the year. The main objective in this work is to do a complete wind characterization at Carmen City, in other words a wind resource evaluation at Carmen city. To achieve this, we will use historical information from meteorological station at Carmen's University Autonomous, UNACAR. The measured velocities for days, months and years will be used to find some important wind markers like: average wind velocity, wind roses, turbulence intensity, wind power density among others. We will use the airport history wind velocity to compare with the data from the UNACAR. The wind velocities coming from UNACAR's meteorological station was measured every ten seconds for four years making more than 202,710 wind velocity data to process in weeks, months, years to have a wind resource evaluation from Carmen City.

Wind resource evaluation, Wind rose, Power density

Análisis de Precipitaciones Pluviales Registradas por la Estación DAVYS-2013, Durante el Periodo 2017, para la Captación y Aplicaciones Sustentables en el Municipio de Centla, Tabasco

Analysis of Rainfall Registered by the Station DAVYS-2013, during the 2017 Period, for the Capture and Sustainable Applications in the Municipality of Centla, Tabasco

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Abstract

The Border City in the Municipality of Centla Tabasco, faces a serious problem of water supply, on the one hand the distance of the catchment is located in the Chichicaste rancharía first section, 50 kilometers from the water treatment plant, on the other, the distribution of the municipal network and the artisan supplies without control (puyones), in both cases the consumption of electric power for pumping the liquid is implicit. It is also important to emphasize that during the rainy months it is frequent that it suffers from floods, since the amount of rain exceeds the drainage capacity. The present work consists of analyzing and studying the rainfall data recorded in the station "DAVIS-2013" located in the Higher Technological Institute of Centla (ITSCe), with the purpose of identifying the temporalities, the theoretical amounts of rainwater collection for its possible use within the Institution and the Municipality, since the rains in the state of Tabasco are abundant phenomena, which even cause damage, so it would be possible to use them to provide an alternative to supplying the vital liquid to the inhabitants of the state.

Rainfall weather, Water supply, Rainfall, Average rainfall, Rainfall collection calculations

Estación Meteorológica para el análisis de la tierra para la siembra del maíz, en el municipio de Jocotitlán, Estado de México

Meteorological Station for the analysis of the land for the sowing of corn, in the municipality of Jocotitlán, State of Mexico

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Abstract

The current climate change affects different areas of development; among them agriculture and particularly that of corn production. In the following work a wireless meteorological (EM) station was designed and built to measure, visualize and store physical magnitudes (temperature, light intensity, atmospheric pressure, relative humidity, wind speed, soil moisture), in any point of a cultivation area, which was validated in Jocotitlán, State of Mexico. The EM measurement system consists of several stages, starting with capture, which consists of measuring each of the physical quantities, transforming them to electrical signals and sending them to a data acquisition card. After processing, signals are transmitted to a computer and processed by LabView software to obtain real time measurements of the physical quantities. The coding, transmission, reception and decoding of the signals was done using XBEE modules. With the automated meteorological information, the farmer would be helped to make opportune decisions in the handling of crops to be able to face any environmental eventuality.

Meteorological Station, Physical Variables, Magnitudes, Sensors

Implantando una Tecnología de Alta Disponibilidad en SQL Server 2016

Implementing High Availability Technology in SQL Server 2016

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Abstract

Currently, all organizations, institutions and companies use Information Systems for automating their processes. The main objective of this article is to demonstrate the use of a technology capable of providing high availability despite failures in the system. The International Standards Organization and the Electronic Commission publish ISO 27002 as a standard of best practices in Information Security, defining as "preserving the confidentiality, integrity and availability of Information". In this sense, this research contributes to the study, analysis and implementation of the use of a high availability technology offered by Microsoft in the database management system SQL Server 2016 called "Mirror", defining a Descriptive methodology for its implementation, having as a case study the Web application "BITA" implemented for the management of digital dental records considering the abundance, relevance and criticality of the information. Finally, it is relevant to mention as added value the management of virtual environments for the implementation of technology.

Microsoft SQL Server 2016, Mirroring, High availability

Cerradura con Seguridad Biométrica y Móvil con Bluetooth

Biometric Security and Mobile Security Lock with Bluetooth

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Abstract

Society is advancing by leaps and bounds, which makes the issue of security, vital, therefore new ways of protecting belongings and new ways of circumventing them, are created every day. Biometric locks are no exception, most systems are based solely on fingerprint reading. This works propose the implementation of a second layer of security: to use also a mobile device registering the MAC address by reading it from the Bluetooth module, this is possible because you can associate it with a user. The algorithm works this way: the user fingerprint is registered in the computer, the mobile is connected using Bluetooth, then a fingerprint sample is taken, and this way the system checks its registration, the connection of the associated mobile device is requested and access is granted or denied. The system has been tested using an Arduino component and has had 99.5% of accuracy when implementing the system in a safe box prototype.

Lock, Biometric, Bluetooth

Diseño e Implementación de ERP académico con llave USB

Design and Implementation of academic ERP with USB Key

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Abstract

It is proposed the development of a web application focused on the generation of indicators to support the decision making of a career division at the level of higher education, with encrypted access credentials. The objective is to design and develop a system that mainly analyzes qualifications by subject and teacher to make reports on the approval and non-approval indexes to provide the administrative staff with indicators and contribute to the decision-making process. For its development, languages and managers such as HTML, CSS, PHP and MySQL were used. As a result, the implementation of the system was achieved, which integrates as mandatory access keys the user, password and an encrypted file in a USB drive, which when removed from the equipment produces automatic session closure in the system. The application provides high, low, modification and search operations for recording grades, schedules, personnel, subjects, groups and department receipts, producing as output tables and graphs that indicate performance by group, subject or teacher

ERP, WEB, USB

Diseño de un Amplificador de Tulio a 2 μm Mediante el Método ASE

2 μm Thulium Amplifier Design with ASE Method

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Abstract

Current fiber optic communication systems demand greater bandwidth, which is possible using longer wavelength bands. This article shows the results of the design of a Thulium doped fiber amplifier (TDFA) with operation at 2 μm . For the proposed design, the analytical solution of the amplified spontaneous emission (ASE) model was implemented. In the optimization of the amplifier, the intrinsic physicochemical values of the doped fiber were fixed, and both, the length of the optical fiber and the pumping power were varied. The results show the output power of the signal and the gain response of the amplifier with respect to the length of the fiber for different pump powers, as well as the power response of the amplifier with respect to the wavelength. It is observed that for greater fiber length, a greater signal power is obtained; however, a higher pumping power is required. The amplifier has a spectral range from 1900 to 2100 nm showing its maximum gain at 2010 nm.

TDFA, 2 μm , ASE

Modelo, simulación y control del sistema eléctrico y electrónico de un sistema eólico de baja potencia

Model, simulation and control of the electrical and electronic system of a low power eolic system

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Abstract

It presents a proposal for the supply of electricity through renewable energy, provided by a low-power wind system with a capacity of 25 kW, for the supply of a building in equipment and lighting systems, establishing the development of a prototype, its modelling, simulation and control analysis, proposing a cost-effective, ecological and clean solution, considering the useful power obtained from the wind within the area where the wind turbine is installed, which is designed for moderate air currents. In the development of the project we obtain the electrical variables according to the mechanical analysis of torque, angular velocity and powers according to the applied loads and the meshing of the system, to go on to establish the electric power, voltage and current, establish the electrical elements such as the permanent magnet generator, in addition to electronic elements such as the current converter and voltage corrector for the control of electrical power and operation; With the simulation of the wind turbine, the interpretation of the parameters to be controlled within our system is defined, optimizing the operation to establish the dynamic and kinetic elements. The development of this system allows to analyse and generate new technologies and alternative solutions, since it can be installed in spaces reduced by the capacity of air currents and wind speed, without polluting the environment and autonomy of supply can be achieved. energy or self-supply, allowing the supply of energy from buildings, or for specific applications such as pumping.

Wind System, Modeling, Simulation, Control, Renewable Energies

Estudio del potencial de generación de metano empleando diferentes materias orgánicas de desecho

Study of the potential for methane generation employing different organic waste materials

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Abstract

This paper contributes to the study of biogas production using different types of organic matter have in the Facultad de Estudios Superiores Cuautitlán. They were manufactured and orchestrated 12 biodigesters the Batch type with capacity of 33 lt each, for a comparison of biogas generation with different types of organic matter at different dilutions and know which features the production of higher biogas, with the highest concentration methane. Two tests were conducted, the first to select the type of organic matter and the second to quantify the production of biogas. The second test lasted 96 days using 12 biodigesters simultaneously with 5 different types of organic matter. pressure, temperature, and pH tests were taken with a gas analyzer to determine the concentration of methane. It was found that the cow dung produces the most biogas, but rabbit droppings produced the highest percentage of methane (above 70%). Some organic materials like pruning grass and food waste were influenced by a very acidic pH that completely inhibited the process of anaerobic fermentation, and some other temperature decreased drastically causing biogas production decrease.

Biogás, Metano, Biodigestor, Composta, Excremento

Caracterización Química de las emisiones producidas por la combustión de las mezclas de Nitrometanol-Biodiesel en un motor de compresión asistida por bujía incandecente de 2t

Chemical Characterization of the emissions produced by the combustion of Nitromethanol-Biodiesel mixtures in a 2t incandling plug-in compression engine

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Abstract

In the present work, the chemical characterization of the emissions produced by the combustion of nitrometanol (nitromethane-nethanol-beaver oil at 20, 71 and 9%, respectively) and biodiesel blends at 15, 30 and 50% in volume was carried out. The experiments were performed using a 2T incandescent spark plug assisted compression engine and the combustion gases were analyzed by Fourier transform infrared spectroscopy (FTIR). The analysis suggest that the nitrometanol mixture generates the heat combustion necessary for the ignition of biodiesel, improving the combustion of the mixtures. This was corroborated by the reduction of CO in the afterburner emissions of the engine, since the decrease of this parameter is usually associated with a better (complete) combustion of the combustible blends. It was also found that the compounds concentrations of the combustion gases and their temperatures in the engine head are related to the nitrometanol-biodiesel blend concentration.

Biodiesel, Análisis FTIR, Emisiones Postcombustión, Motor

Reciclado del poliestireno expandido en instituciones educativas para su uso como impermeabilizante. Caso de estudio: Universidad Politécnica de Altamira

Recycling of the expanded polystyrene in educational institutions for use as a waterproofing. Case study: Universidad Politécnica de Altamira

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Abstract

Currently the preservation of the environment is a necessary issue, which is causing changes in the culture of people. The expanded polystyrene (EPS) or better known in Mexico as uncel, is one of the most used materials for packaging and packaging food. Being of high consumption, it is also high volume of waste, and this, in the Urban Solid Waste (RSU, acronym in Spanish), is a polluting material that requires many years for its degradation. The objective of this work is to reuse the uncel that is discarded inside the universities, mainly in the cafeterias, to produce a waterproofing that can be used within the same institutions. In this way, it is intended to save on expenses and reduce waste in uncel. To achieve the above, four stages were carried out in this process. In the first stage, EPS was collected at the Polytechnic University of Altamira. As a second stage it became a pre-treatment. In the third stage the solvent was determined to form the resin. In the final stage, the operation of the resin as waterproofing is validated. With the above you can create a useful product for universities, as well as the culture of recycling EPS, in addition to reducing the amount of EPS that reaches landfills or open dumps (TCA acronym in Spanish).

Recycling, Unicel and Waterproofing

Estudio de la logística integral en las medianas empresas de transformación en la ciudad de Villahermosa, Tabasco para la generación de una propuesta de desarrollo

Study of integral logistics in medium-sized companies of transformation in the city of Villahermosa, Tabasco for the generation of a development proposal

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Abstract

The present study analyzes the different variables of the context and the impact on logistics activities for a study in medium-sized processing companies, located in Villahermosa, Tabasco. The methodology that was used from the selection of the experts was the Delphi method, favoring that they had the key elements to develop the criteria and factors, factors that constitute the variables such as: Economic, Social, Cultural, Technological, Environmental, and Political, and the impact they produce in a context of the region. Obtaining these results was not only an immediate benefit for the study companies, but also a pertinent guide for the other companies, for collaboration between states of the republic, as well as for future investors in the sector. From the selected sample experts were identified as support who participated directly when applying the measurement tools, to obtain a true and integral diagnosis of the study companies which allowed to get to design a model for the systematization of the logistic process in the transformation companies of Villahermosa, Tabasco, being the deliverable for them.

Integral Logistics, Productivity, Quality

Cápsulas multimedia para cuentos infantiles

Multimedia capsules for children's stories

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Abstract

This article explains the elements that were considered to develop a multimedia material on the subject of science and technology, as well as the monitoring of reproductions on popular social networks. The development of multimedia capsules is presented with the aim of awakening the interest towards science to the people who watch the videos. The capsules for stories aim to explain to people, in a fun way, some notes or scientific facts that stimulate curiosity and imagination, allowing in a meaningful way to assimilate new knowledge. The objective of this work is to create animated capsules to analyze the number of followers and reproductions of the videos, in the most popular social networks in Mexico, in order to determine the best technological means for the dissemination of science. The phases of planning, design, development, evaluation and implementation for the realization of the capsules are described. In the results and conclusions can be shown the statistical data of the creation of the capsules, in addition to the data collected from the monitoring of the reproductions of the videos and followers in three of the most commonly used social networks in Mexico.

Multimedia, Science, Social Networks, Technology

Innovación Tecnológica en las Organizaciones

Technological Innovation in the Organizations

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Abstract

Technological innovation has been changed in an accelerated way during the last twenty-five years, which was come in to a globalization of administrative processes within the organization, the tools and techniques or instruments are used to analyze situations that have to be evaluated in a suitable manner and suggest alternatives to encourage decision-making. The elaboration of new technological strategies has allowed to innovate new business models that impact the technologies in the competitiveness in new paradigms in the labor market, as first activity it is necessary to know the environments that approval the quality and benefits given by an innovative strategic plan, the purpose of this research is to transform the performance enhancing the work performance with the use of virtual environments such as mobile devices of new generation. Innovation consists of an idea, selling the idea, developing the idea and evaluating the idea, thus creating an innovative business model using the tools to restructure a reengineering of administrative process within the organization. Also requires the knowledge and skills of the employee to create new complex environments that support the daily-activity inside the organizations.

Technological Innovation, Virtual Environments, Organization

Ubiquitous Learning como medio para incentivar el aprendizaje colaborativo

Ubiquitous Learning as a means to encourage collaborative learning

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Abstract

This paper describes a ubiquitous learning environment focused on the development of practical skills, and its preliminary evaluation. Employing an Active Environment with context-aware applications and multimodal interfaces, the intention is make a strongly influence on learning activities through a collaborative practices laboratory, able to make an assessment of attendance, discipline, behavior, proactivity, performance, leadership on students working teams, among others, skills with certain degree of difficulty to be assessed in an electronic learning system. The proposal implements the concept of Ubiquitous Learning (U-Learning), an evolutionary concept of Electronic Learning (E-Learning), exploiting the benefits of Ubiquitous Computing and Electronic Learning tools, encouraging the knowledge generation and the development of cognitive skills through an Active Environment. Ubiquitous Computing allows learning activities to be integrated into daily life, without restricting schedules or physical spaces, that is, it is pervasive and continuous, where the interaction between all the members of the student community takes place.

Ubiquitous Learning, Collaborative Learning, Teaching and Learning Strategies

Higiene, seguridad y ergonomía industrial en el entorno físico y de los factores humanos en la aeronáutica

Hygiene, safety and industrial ergonomics in the physical environment and human factors in aeronautics

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Abstract

The lack of training of personnel in general, as well as in the knowledge of the influence of Ergonomics in any industry, results in a lack of efficiency in the performance of human factor activities

Objectives: Determine the impact of ergonomics on manufacturing tasks within the aeronautical industry. Identify the close relationship of the above with the human factor with respect to the performance of manufacturing tasks.

Methodology: The interaction of the human factor will be observed in relation to the physical elements of the environment and the impact of ergonomics through different practices in laboratories or aeronautical manufacturing workshops. Behaviors that express the level and type of awareness of the situation and the ergonomics of management in relation to the human factor will be recorded. Finally, a quantitative and qualitative analysis of the results obtained through the application of the instruments was carried out to identify the factors related to situational awareness and ergonomics, to improve manufacturing tasks within the aeronautical industry.

Contribution: An institutional document, which will help to generate knowledge, to support seminars, courses and workshops for the human factor, industrial safety and hygiene in aeronautical manufacturing.

Ergonomics, Human Factors, Industrial Safety

Mecanismo de Copias de Seguridad como Estrategia de Recuperación

Backups as a Recovery Strategy

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Abstract

The principal objective of this article is to analyze the generation, administration and automation of backups as a recovery strategy, allowing the display of an easy, useful and automated technology to prevent the catastrophic loss of information. The study describes step by step the design of a strategic plan to determine how, when and where backups are produced, stored and maintained as a recovery strategy. The research is carried out with a descriptive methodology for the analysis of a case study. Specifying, the information that is backed up, the type of backup and its frequency. Likewise, it is highlighted that the implementation of this technology is used within the database management system itself (Microsoft SQL Server 2016), without additional economic cost and generates significant value that the process can be automated in its entirety. A valuable contribution to minimize information losses, a technology that has transcended through time due to its flexibility.

Recovery, Backup, Microsoft SQL Server 2016

7 Medicina y Ciencias de la Salud

Implementación de la realidad aumentada en el tratamiento de niños con TEA: Interacción con el entorno

Implementation of augmented reality in the treatment of children with ASD: Interaction with the environment

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Abstract

According to the International Convention for the Rights of Persons with Disabilities of the United Nations, the correct term to refer to someone with special or different capacities is "Persons with Disabilities (PCD o PWD)". Among these are children who have autism spectrum disorder (ASD), which is a condition where there is a developmental deficit (permanent and profound), which hinders their interaction with the environment. Augmented reality (AR) is a booming technology implemented in different applications focused on the health sector, such as the company CAE HEALTH CARE for medical simulations called "VimedixAR". In the treatment of ASD, there are some projects where they implement AR, such as the emotion games proposed by Shuchi K. Bhatt. This paper presents the implementation of AR Technology in the treatment of children with ASD, through the project called "MY WORLD". The objective of the project is to achieve through the implementation of the AR and the use of multimedia content to facilitate the treatment focused on the interaction of a child with ASD and his environment.

Augmented Reality, Autism, treatment

Adaptación y habilitación fisioterapéutica de prótesis articulada mioeléctrica de mano

Physiotherapy and enabling adaptation of myoelectric hand prosthesis articulated

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Abstract

The project designated with the name "physiotherapy and enabling adaptation of myoelectric hand prosthesis articulated" has as its objective the construction and implementation of the prosthesis. The project is multidisciplinary and multi-institutional in nature, as the construction and design includes the areas of manufacturing, electronics (sensors and biosensors), programming and the area of Physical Therapy. The project consists of 3 basic parts: the first, the design, which offers an innovative prototype of mioeléctrica prosthetic hand with interphalangeal joints and independent movements of the fingers, allowing the patient to return to activities of daily living and employment; the second is the construction that allows, be prepared and produced at a low cost with easy-to-repair parts giving the possibility to adapt the prosthesis to the longitudinal growth of the fingers; and the third, training and implementation in a patient amputee, where by means of techniques of neurorehabilitacion will prepare the patient both physically and psychologically to receive and handle the prosthesis, enabling in the handling of your environment The same.

Myoelectric Prostheses, Physical Therapy, Amputation

Análisis Software de Optimización de Redes biomecánico de la acción sentarse-levantarse para el control de exoesqueletos

Biomechanical analysis of sit-to-stand transition for control of exoskeletons

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Abstract

People who have suffered a stroke (hemiplegia) have difficulties in daily life such as stand up from a chair and sit down. An exoskeleton is an electromechanical system coupled to the extremities of the human body focused on increasing its strength, speed and performance mainly. Lower-limb exoskeleton can help or assist patients with hemiplegia to get up or sit down from a chair. This paper presents a study of the biomechanics of the human being when getting up and sitting in a chair, to obtain the times and angular positions. This analysis provides information to the controller of the lower-limb exoskeleton for a more natural movement when lifting a patient from a chair. Virtual simulations, under the MSC Adams software environment, of an exoskeleton of lower extremities of six degrees of freedom (dof) are presented. Classic controllers (PD, PID) are implemented in the exoskeleton considering the patient weight. The results show better movement is obtained and at the same time, the torques required when lifting the patient from a chair are minimized.

Sit to stand, Lower-Limb exoskeleton, Biomechanical analysis

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Licencias del Sitio

03-2010-032610094200-01-Para material impreso, 03-2010-031613323600-01-Para material electrónico, 03-2010-032610105200-01-Para material fotográfico, 03-2010-032610115700-14-Para Compilación de Datos, 04 -2010-031613323600-01-Para su página Web, 19502-Para la Indización Iberoamericana y del Caribe, 20-281 HB9-Para la Indización en América Latina en Ciencias Sociales y Humanidades, 671-Para la Indización en Revistas Científicas Electrónicas España y América Latina, 7045008-Para su divulgación y edición en el Ministerio de Educación y Cultura-España, 25409-Para su repositorio en la Biblioteca Universitaria-Madrid, 16258-Para su indexación en Dialnet, 20589-Para Indización en el Directorio en los países de Iberoamérica y el Caribe, 15048-Para el registro internacional de Congresos y Coloquios. financingprograms@ecorfan.org

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9 786078 534746
ISBN 978-607-8534-74-6



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