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March 13th – 14th

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Universidad Francisco de Paula Santander

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March 13th and 14th 2020
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ISSN 2539 – 1885 [Online]

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Henry Gallardo
José Alexander Contreras
Elena Elsa Bricio Barrios
Santiago Arceo Díaz
Magda Francisca Cejas Martínez
Derling José Mendoza Velazco
José Eduardo Silva Arellano
Jaime Alberto Bricio Barrios
José del Carmen Aréchiga Maravilla
Juan Pablo Salazar Torres

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IV International Meeting of Mathematical Education

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Sharing the motto "Mathematics is everywhere" and its icon "The Crane" symbolizes honesty, maturity, judgment that ensures the growth of all in spite of unseasonable winds and integrity, the objective of the IV International Meeting on Mathematics Education is to create and maintain a space that privileges and promotes the culture of mathematics, reflection and discussion on education and the application of mathematics, statistics, its history, evolution and didactics, and its interrelationship with science. At the meeting, researchers, scientists and mathematics teachers socialize research results, consolidate networks for the exchange of successful experiences, with the purpose of strengthening mathematics education at different educational levels, promoting innovation, and fostering the creation of educational policies, models, strategies, tools and techniques, in various areas of knowledge, and encouraging students' interest in research.

This academic space has been maintained, so in the first semester of 2017 the First International Mathematics Education Meeting was held, with the presence and participation of teachers, students and professionals from different university, basic and secondary education institutions. During the Summit, researchers carry out activities such as, master conferences, short lectures. In this year 2020, the meeting incorporates mathematical culture and language development as a means to promote creative and mathematical thinking, so this version develops the Mathematical Story Contest in preschool, children, university, adult and senior categories, as well as the presentation of posters, the development of geometric murals, the recognition of mathematical educators who graduated from the master's degree in mathematical education, the development of elements through origami, mosaics and paintings, training and master courses. The meeting enabled educators and researchers to learn and connect with the international mathematical modeling and applications community and thus to promote advocacy in this field.

In 2020 the IV Meeting is articulated with the awarding of the Medal μὶ - UFPS, "Medal for Research and Innovation in Mathematics Education". Through a day of recognition of professors, researchers and graduates with high quality and products of research and innovation, in order to recognize the great academic value it has for the Universidad Francisco de Paula Santander, in its contribution to training in research, innovation and / or artistic and cultural creation in the last two years, with the direction or co-direction of master's theses and meritorious mode, the generation of knowledge and its intellectual production in terms of authorship, co-authorship in the publication of articles from indexed journals, book chapters, lectures.

ISSN 2539 – 1885 [Online]

Thus, educators in mathematics were recognized, a prize for the female educator in mathematics as a tribute to the role of women in science, a prize for inclusion and a prize for directors who have developed advances in science and technology by strengthening the research of groups in the Master's program in mathematical education at the Universidad Francisco de Paula Santander.

Since 2017, the community, especially the students and graduates of the Master's program in Mathematics Education have participated and strengthened their action thanks to the meetings and networks that this event fosters, on an annual basis, thus achieving, each year, the integration of researchers, students, teachers and businessmen from countries such as Colombia, Argentina, Belgium, Ecuador, Mexico, Chile, Spain, Venezuela, Italy, Brazil, among others. It is a valuable opportunity for educators and researchers in mathematics from all over the world to learn more about the development in the promotion of mathematics education, he said that the generation of knowledge is framed in the way of understanding the world, in the logic that is always understood from the perspective of the author, in education research showed the dissemination of knowledge, the generation of models and applications in science.

The Mathematical Education Meeting, since its first version, has had the purpose of promoting the scientific productions of the professionals, projects of scientific analysis of complex data in multidisciplinary situations, fulfilling one of the strategic objectives of the University, therefore the diffusion of the advances and results of the research, of the mathematical education and of the engineering, that allows to strengthen the academic programs and contributes to the integral development of the students and future professionals.

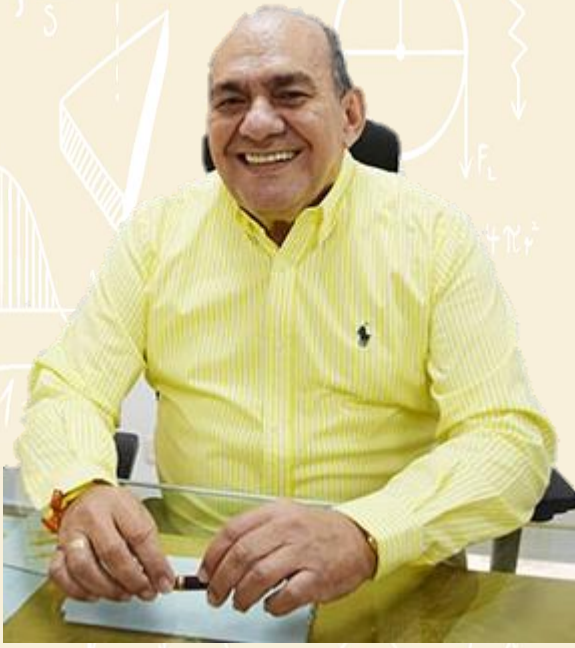
The Meeting of Mathematical Education in its fourth version is commemorated on the International Day of Mathematics, March 13 and 14, 2020, in the city of San José de Cúcuta, Colombia. The International Day of Mathematics (IDM), worldwide celebration in Each year on March 14 all countries participated through activities for both students and the general public in universities, schools, museums, libraries and other spaces. The Meeting of Mathematical Education with the presence of PhD. Alfredo Torres Carrillo, maximum representative of education in Colombia with themes in critical pedagogy and its incorporation in mathematical education. This academic space had been maintained, and for this reason the first semester of 2017 had the I international meeting in mathematical education, which had the active participation of teachers, students and professionals from different University. The meeting allowed educators and researchers to learn and connect with the international mathematical modeling and Applications Community and thus boost promotion in this field.

ISSN 2539 – 1885 [Online]

Researchers participating in the meeting stated that the generation of knowledge was framed in the way of understanding the world, in the logic that is always understood from the perspective of the author, from the viewpoint and current generation, because the generation frames the way of being in the world and becomes dominant or hegemonic, in education research showed the dissemination of knowledge that explained phenomena of human behavior through scientific dissemination modify the way of behaving, so the academic work disseminated contrasted the practice and reality that is desired to modify.

"Mathematics is everywhere"

“Las matemáticas en los diferentes programas académicos de nuestra Universidad Francisco de Paula Santander, permiten la formación de profesionales e investigadores con altas competencias, habilidades y capacidades para la innovación, el desarrollo tecnológico, la solución de problemas sociales del ámbito regional, nacional y mundial. La UFPS es una Universidad con programas de alta calidad donde el estudiante es el centro del proceso misional”



Héctor Parra
Rector

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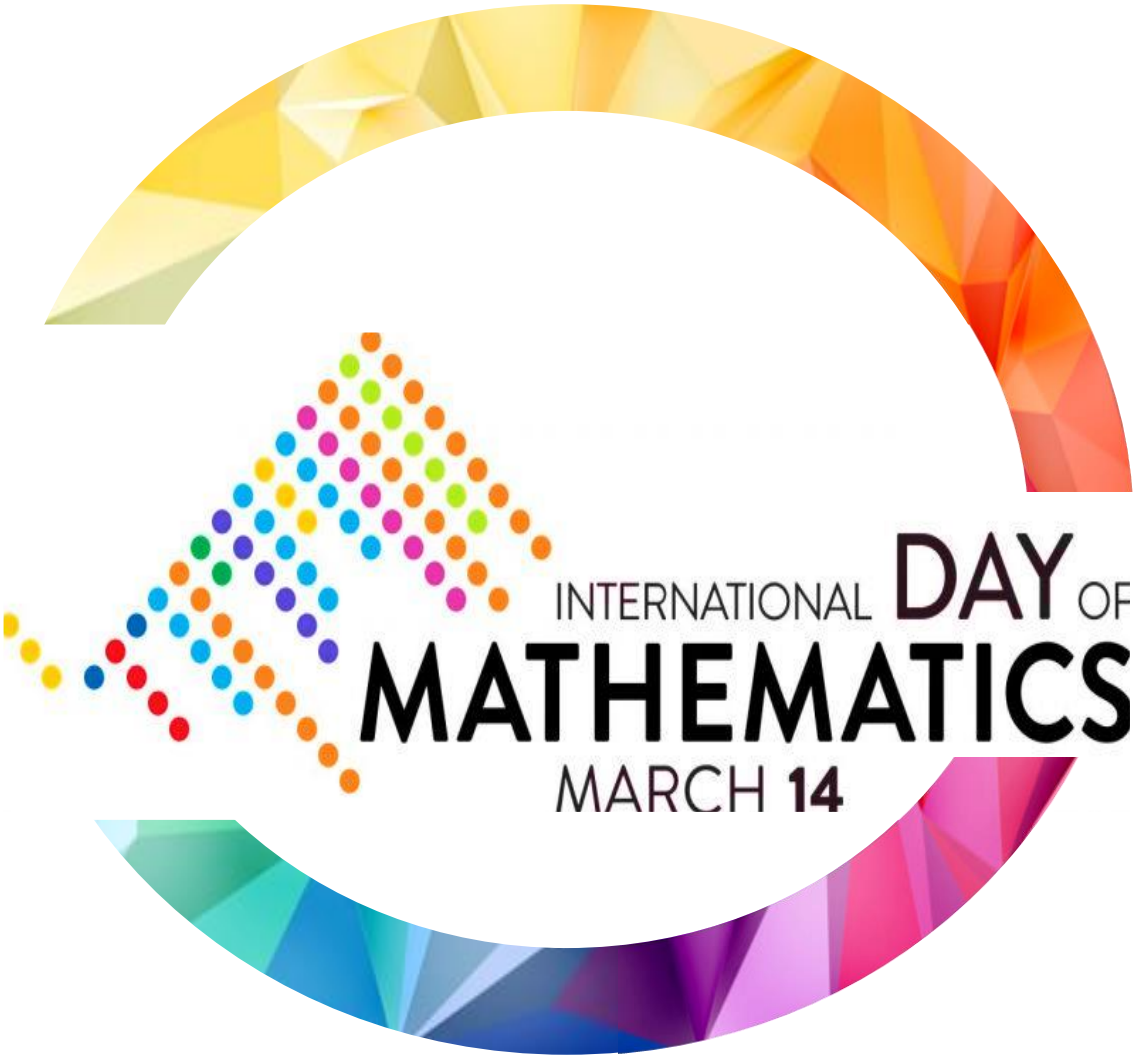
Mathematics is the alphabet with which God has written the Universe.
-Galileo Galilei



Mathematics is a gymnastics of the spirit and a preparation for philosophy.
-Isócrates

Organizing Institutions

University

Universidad Francisco de Paula Santander.

Higher Education Institution

Escuela de Administración Pública - ESAP.

University

Faculty of Basic Sciences - UFPS.

University

Department of Mathematics and Statistics - UFPS.

University

Master's degree in Mathematical Education - Postgraduate UFPS..

University

Bachelor's degree in Mathematics Education - UFPS.

University

Bachelor of Architecture - UFPS.

Research Group

Research group on statistics and probability - UFPS.

Organizing Institutions

Research Group

Universidad Francisco de Paula Santander.

Research Group

Research group in mathematical education- UFPS.

Research Group

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Research Unit

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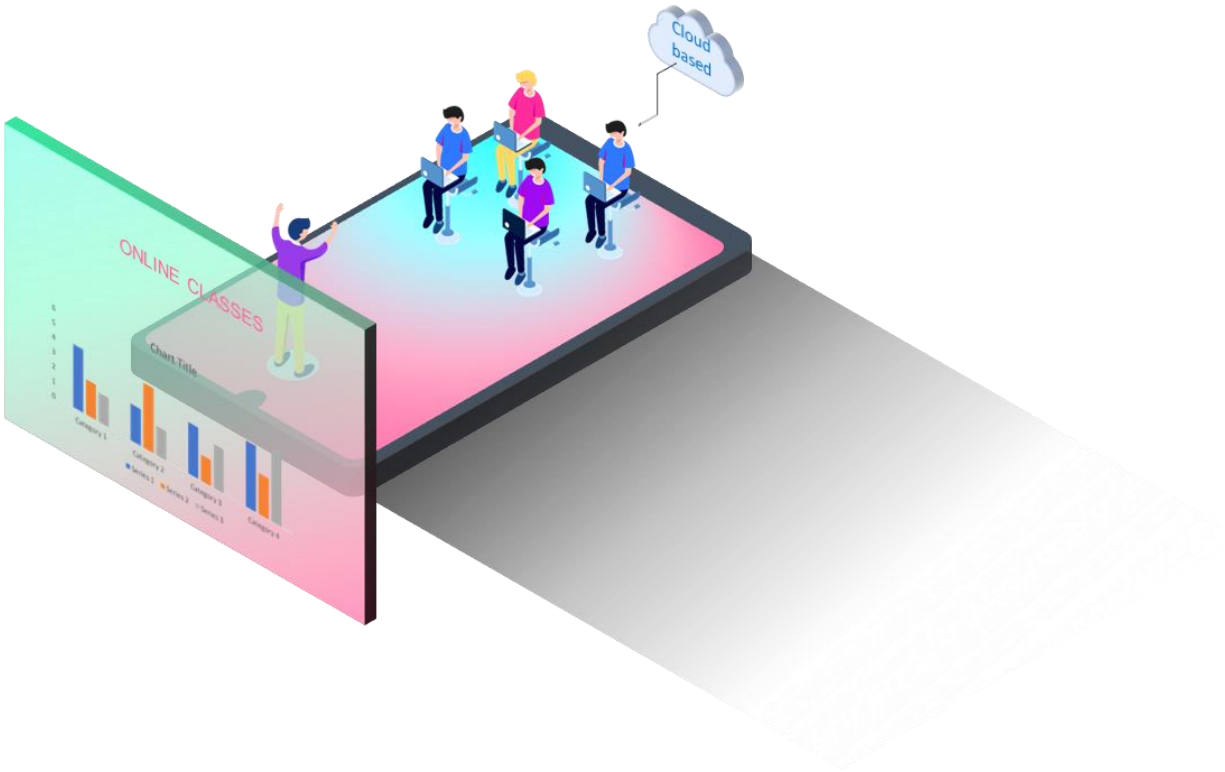
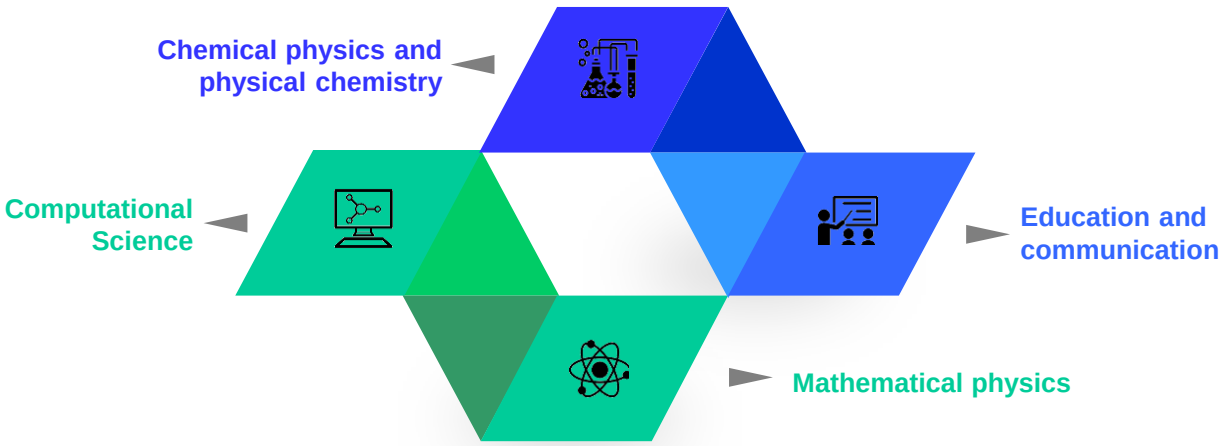
General objective



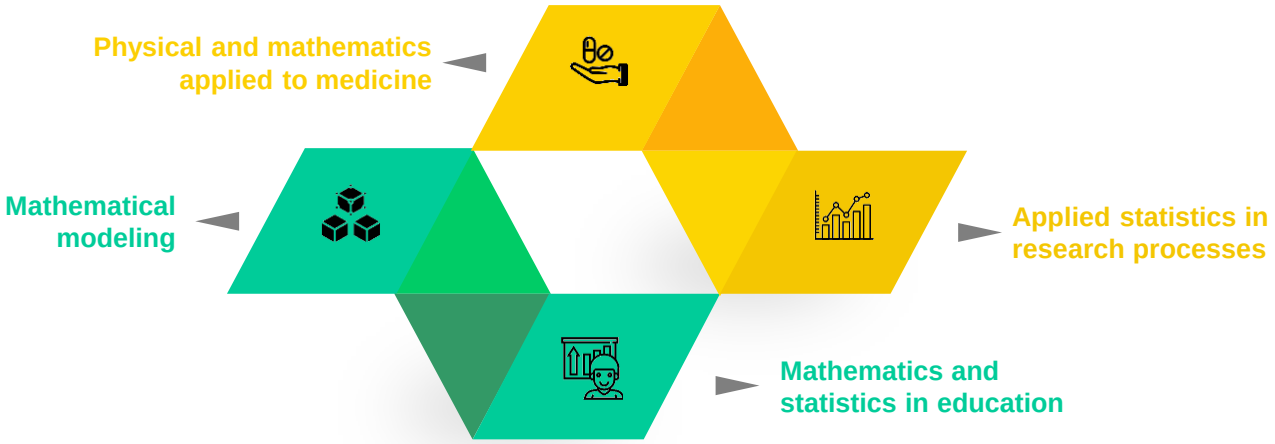
To develop a favorable environment for interaction among academics, students, professionals and different actors interested in the area of knowledge, which allows the appropriation of experiences and the knowledge of new trends in the different fields of the topics and/or thematic axes that affect mathematical education.

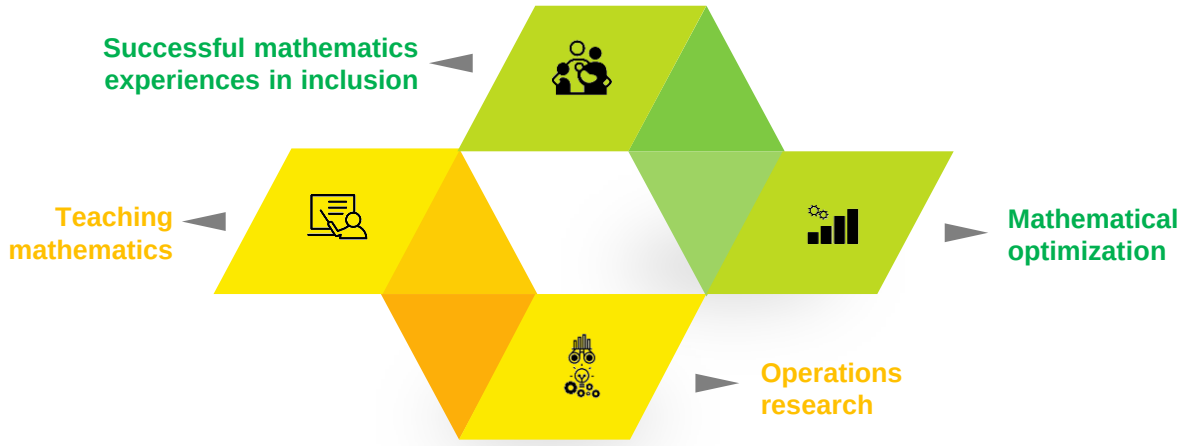
Topics

The International Mathematics Education Meeting seeks to integrate the higher education sector and national and international basic and secondary education institutions, through the successful experiences shown by each one of the participants who tended to focus on the themes on: Science and engineering education, science projects, scientific computing, mathematical modeling, mathematics and physics applied to medicine, education and communication, development and earth sciences, statistics in research, pure and applied mathematics, were taken as main topics for this event:



Topics


Physical and mathematics applied to medicine
Mathematical modeling
Applied statistics in research processes
Mathematics and statistics in education


Successful mathematics experiences in inclusion
Teaching mathematics
Mathematical optimization
Operations research

ISSN 2539 – 1885 [Online]

Table of content

Factors associated with capacities development in learning physic associate on numerical systems and hamming code

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Abstract. Mixed is the research uses participatory action research tools within qualitative research, and factor analysis from the positivist approach; identifies and analyses factors associated with problem solving in capacity development within the framework of the metacognitive approach with operations of numerical systems and detection error with Hamming code in the childhood of public educational institutions located in the border area of the Municipality of Villa del Rosario-Colombia. For this purpose, a diagnostic test was applied, which allowed the identification of difficulties and variables related to learning and application in real contexts; and a post-test that evaluates projects as a didactic strategy. There was evidence of the construction of knowledge and the application of these to practical life, also revealed that it was possible to awaken interest and motivation in students which significantly improved their level of analysis, interpretation and reasoning. Associated factors were coexistence, emotional didactic proposal, classroom projects, meta cognitive skills, self-control and evaluation.

Descriptive analysis of storytelling concepts in physics

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Abstract. The research identifies storytelling concepts in Physics from university professors. The research follows a qualitative approach applied to 250 participants from universities in the Norte de Santander department. The results identify three categories associated with the application of science, the function of the history of Physics and scientific production. It is concluded that participant's concept storytelling as the art of telling a story and a didactic resource associated with approaches, the development of skills, useful to analyze the development of discoveries in Physics, its actors, its application in scientific advances and its contribution to innovation and community development.

Mathematical analysis of the operating point Q in the design of bipolar amplifiers through a computer tool

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Abstract. This article presents a computer tool for the design of the Q operating point and the power dissipation in amplifiers with bipolar transistors; it was represented through a flow chart and coded using a computer tool (graphic interface). This allows to enter the values of voltage gain, output impedance and input impedance, transistor current gain and power supplies, to give as a result the values of the resistors. It also allows modifying the operating point Q of the transistors allowing to graph in real time the behavior of the load line and the output signal of the amplifier. Different designs were made with the designed graphic interface, where the results obtained were compared with an academic software approved by the scientific community. The errors in all variables evaluated were less than 1.5%. It is concluded that the computer tool (graphic interface) allows to design amplifiers with bipolar transistors with accuracy and depending on the need or application of the amplifier, the operating point Q is located on the load line to obtain an output signal without distortion and with the lowest power dissipation.

Grillakis, Shatah and Strauss theory for orbital stability of traveling wave solutions

E Ibargüen-Mondragón[1], **M. Vergel**[2] **and S. Hidalgo-Bonilla**[3]
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Abstract. The theory on orbital stability for traveling wave solutions of nonlinear systems of evolution differential equations in their Hamiltonian form developed by Grillakis, Shatah and Strauss (GSS theory) in 1987 has become one of the most practical tools to study the behaviour of this type of solutions. In this article we present the main result of the GSS theory and some differential equations in which the applicability or non-applicability of the result is verified.

Malthus model, regressions and population growth dynamics

E Ibargüen-Mondragón[1], M Vergel-Ortega[2] and O L Rincón-Leal[2]
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Abstract. In this work we use exponential and linear regressions to estimate the exponential growth rate k of the Malthus Model. With data of daily new cases worldwide of COVID-19, it was estimated that between February 19 and March 28, 2020 the incidence rate was k = 0.1317, in consequence 13 of each 100 people were infected with COVID-19 in this period. It was also observed that after March 28 the daily positive cases of COVID-19 continued with a non-exponential increase. However, we cannot conjure that on March 28 the pandemic reached its highest peak, since in this period there was exponential growth of positive cases of COVID-19 only in some countries.

Finite difference method applied to heat transfer in polymers

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Abstract. The study of heat transfer has the importance of serving as a basis for understanding thermal properties in materials in addition to serving as a theoretical tool in the training of mechanical and civil engineers. Techniques for studying heat transfer include topics such as Fourier analysis, Bessel functions, Legendre polynomials, etc. The problems studied in the subjects of heat transfer in civil engineering and mechanical engineering have the disadvantage of illustrating ideal situations far from a real context. The proposal of the present work is to study the thermal diffusion in a polymer designed in an experiment, in order to show the study of heat transfer in a context of practical use with interest for engineers and mathematicians. Throughout the work, the study of the heat transfer model in the polymer is proposed, making an analysis of the temperature profiles generated by numerical and analytical methods.

Construction of the concept of derivative of a function using the graphic calculator

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Abstract. Differential Calculus in in High Education Institutions had been influenced by a traditional formulism which limits the capacities of analysis and abstraction, constraining an interrelation of focused contents through algebraic formulas with a unique and essential tool in learning – teaching process. For this reason, this article represents an analysis about difficulties that show the students toward a derivative problem resolution. The investigation methodology is mixed through an interview geared to teachers and the application of a test to students using the Calculator Voyage TI-92. The obtained results in the students' test showed interests and skills of learning using Voyage TI-92 calculators getting familiar with the derivative notation and identifying through a graphic it was identified the type of function and the first and second derivative concept. Since multiples perspectives it is necessary the integration of Information and Communication Technologies.

Teaching the wave concept through problem-based learning

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Abstract. Wave movements can be studied from autonomous work done by the student since they are processes in which he can appreciate and understand how energy is transmitted from one part to another without transfer of matter. Problem-based learning is a good alternative to study the concept of waves since it sequentially leads the student to structure the knowledge to use it in context, to develop effective processes of reasoning, to develop self-directed learning skills and to motivate him for learning, together with the development of the capacity to work in a team. The research concludes that applying this methodology to the teaching of physics leads to better educational outcomes than traditional teaching while generating greater motivation and interest in learning. It also allows students to integrate knowledge into their context, visualize the usefulness of learning, and apply knowledge to the solution of problems in their environment, in other words, it allows students to achieve significant learning.

Evaluation of the teaching strategies that promote mathematical competence in the students of the Liceo Bolivariano Mariscal Antonio José de Sucre

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Abstract. The strategies for teaching mathematics are conceived as a set of actions carried out by the teacher, with the conscious objective that the student learns in the most effective way; they are actions controlled by the teacher and have a high degree of complexity and include the teaching means for their implementation, control and evaluation of purposes. Within these guidelines, the teacher who promotes mathematical competencies: thinking and reasoning, communication, conceptual structure, representation, phenomenology and modeling; will have in his or her hands a tool that will substantially improve the teacher's pedagogical practice and especially the strategies for teaching Mathematics. The research is framed within the interpretative paradigm, is of a descriptive type and its design is a case study. The research was carried out in four phases: the first phase "preparatory", documentary; the second phase "field work" where the observations to the teacher were made, a questionnaire was applied to the students and an in-depth interview was carried out. In the observations and the in-depth interview it was found that the teaching strategies that promote mathematical competence present deficiencies in some categories. In the questionnaire it was found that the teacher teaches a traditional teaching model, characterized by the transmission of elaborated, pre-designed concepts and expected behaviors. The third "analytical" phase where the information was reduced, synthesized and transformed; and the fourth "informative" phase where the results are made known and the research is disseminated. It is concluded that the teaching strategies of mathematics are determinant in the promotion of competences in students, that is why it should be emphasized that teachers include in their classes teaching strategies that emphasize the solution of problems based on competences and not on repetitive and mechanical processes.

The pedagogical knowledge of the mathematics teacher and the reflective practice. Case study: Liceo Mariscal Antonio José de Sucre, Guásimos, Táchira, Venezuela

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Abstract. Education is an issue that has been in the public opinion of many countries, social structures, and in the design of policies and economic, because it is considered key to the development and progress of them. Within these configurations are the teaching processes developed by high school mathematics teachers working in public institutions in Guásimos, Táchira, Venezuela, as well as the pedagogical knowledge that has been developed and consolidated by them, inside and outside the learning environments, as an adaptation of pedagogical theories and models, of reflection in action and on action, in addition to the experience accumulated over time. In this way, the research aims to theoretically reconstruct the pedagogical knowledge of the mathematics teacher, as a methodological notion of its academic, experiential, routine and theoretical components, and its implication in reflective practice. The research design is framed within the interpretative paradigm, since it seeks to interpret and analyze the construction of knowledge of a complex nature, and is also descriptive and its design is a case study, since it focuses on the case of a teacher. The research was carried out in three phases: in the first part the conceptual aspects were investigated; in the second stage "the field work" was carried out where an in-depth interview was applied to the mathematics teacher. In the third and last phase, the information was reduced and synthesized to extract the pertinent conclusions. It was concluded that the construction of the pedagogical knowledge of the Mathematics teacher is weakly composed by the interaction with the peers, because there is mutual distrust and suspicion, however, when it comes to the accumulated experience of the teacher (practical knowledge) it presents levels of complexity and strength.

GeoGebra as learning tool for the search of the roots of functions in numerical methods

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Abstract. The usage of GeoGebra, as a didactic tool to illustrate the functioning of single root searching algorithms, is described. By using the dynamical graphic's view of GeoGebra, it is proposed that engineering students taking a numerical methods course can improve their understanding of how the bisection, false position, secant and Newton-Raphson methods are able to and approximated solutions to polynomial equations. Students, within a experimental group, use the iteration formulas of each method to plot the position of approximated solutions for a given polynomial equation and, based on the position of each consecutive root make conclusions about the relevant characteristics of each method and their convergence (or divergence) to the exact solutions. The results are compared against traditional learning, based on memorizing the steps of the algorithm for each method and the representation of the convergence of successive roots by numerical tables.

Trans – complexity: a management fad or a mathematical construct

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Abstract. Trans – complex organizations concept has been introduced in the management science, even becoming an object of study.. In the global context, definitions, concepts, research and philosophical or practical proposals have emerged for the understanding of organizations from a trans-complex perspective. In this work, a critical position of trans-complexity is presented as a historical discovery that associates a new characterization of phenomena: for example, in exchange for trans{complex organizations, a trans{complex epistemic vision of social organizations is proposed. Thus, the trans-complexity is ratified not as a quality, but as a requirement of epistemic order of scientific research. From this perspective, that complex organization can be explained through elements such as uncertainty, chaos and self{organization, with an epistemological explanation of systems theory, decision theory and dynamic systems theory. This paper shows the trans{complexity more than a management fad, an analysis model or a management topic, as an element to be incorporated by researchers in the construction of theoretical frameworks and methodical designs of their researches in order to purpose significant contributions to science, and to the organization itself, based on such important mathematical theories.

Developmental perspectives of numerical thinking

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Abstract. This research reveals the perspectives in the teaching of numerical thinking through a documentary review. A documentary sample integrated for 40 sources on numerical thinking such as articles published in indexed journals, postgraduate dissertations, and books is considered. A qualitative content analysis method is used. First, an encoding procedure is applied for tagging the extracted information from the source documents. Then, a split and merge procedure is considered in order to establish from the tags the dimensions and categories that allow determining the conceptual relationships that support the developmental perspectives of numerical thinking. The method reveals that the numerical thinking can be developed in the global context from four perspectives, namely, historical, theoretical, curricular, and social perspectives. From these results, an incorporation of the such perspectives can be institutionalized for promoting curricular, didactic and evaluative new proposals for numerical thinking teaching.

Analysis on the mechanic resistance and water absorption capacity of prototype mortar with residual coconut mesocarp and fiber aggregates.

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Abstract. The mechanical resistance to mortar with coconut mesocarp and fiber aggregates and the volume of water absorbed after the setting process was tested. Four different mixtures, in which the volume occupied by Fiber and mesocarp granules was analyzed.

On preservation properties and a special algebraic characterization of some stronger forms of the Noetherian condition

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Abstract. We give an elementary proof of the preservation of the Noetherian condition for commutative rings with unity R having at least one finitely generated ideal I such that the quotient ring is again finitely generated, and R is I – adically complete. Moreover, we offer as a direct corollary a new elementary proof of the fact that if a ring is Noetherian then the corresponding ring of formal power series in finitely many variables is Noetherian. In addition, we give a counterexample showing that the 'completion' condition cannot be avoided on the former theorem. Lastly, we give an elementary characterization of Noetherian commutative rings that can be decomposed as a finite direct product of fields.

Conceptual computation as a paradigm-shifting technique in artificial mathematical intelligence

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Abstract. We describe in a very concise way the multidisciplinary program of artificial mathematical intelligence and the need of a new and improved paradigm of formal computation based on conceptual generation, called conceptual computation. Furthermore, we describe some of the most outstanding results regarding fundamental cognitive abilities needed for the materialization of conceptual computation such as analogical reasoning, metaphorical thinking and conceptual blending. Finally, we present a concrete example of the conceptual computation of the notion of binary contiouous operation as a formal blend (i.e. many-sorted first order categorical colimit (pushout)) of the notions of continouos function between topological spaces and perfect square topological space.

Evaluation of the mechanical behaviour to the force of tension between thermoplastic materials of origin and recycled

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Abstract. The use of plastic products and polymeric matrix compounds is increasing in engineering, most of these materials are subjected to dynamic loads, therefore, are constantly evaluated according to experimental methods that allow a characterization of their main properties. Therefore, this research work consisted in carrying out the characterization of mechanical properties of thermoplastic materials of different origin; commercial and recycled, where three cases were worked: Polymethylmethacrylate (PMMA), polyvinyl chloride (PVC) and polypropylene (PP), for which there were 3.5 ± 0.1 mm thick sheets, manufactured by extrusion and supplied by a local supplier, in the city of Cúcuta, Colombia. Afterwards, the specimens or samples were cut for the tension test adapting the shape and geometry, according to the ASTM D-638-14 standard, using laser cutting for such purpose, the specimens were conditioned at a temperature of 20°C during 40 hours prior to the moment of the tension test, the equipment used was a universal machine branded EMIC commercial reference DL2000 N° 11760 NS 784 with a speed adjustment of 5 mm/min to keep within the times given by the standard. Once the tests are performed, the stress/strain graphs of each case studied are obtained and the experimental results are analyzed from the data provided by the software "Tesc versão 4.00". Afterwards, Young's module is statistically analyzed and compared in each study, seeing which one presents the best behavior under the studied load conditions, raising a hypothesis, where the question is if the differences in the sample between Young's module can come from a population with an mean of zero, in this case, it is concluded that there is no difference between Young's module values for PMMA and recycled PMMA, the same happened for PVC and recycled PVC and PP and PP of recycled origin.

Nanotechnological applications of polymer-drug conjugate as oncological treatment

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Abstract. In recent years, the popular term "polymer-drug conjugate" has been introduced to describe new drug targets to combat diseases such as cancer. Due to its potential benefits in terms of human health, this concept has managed to gain attention in the pharmaceutical industry. These innovative developments involve detailed processes in materials science, as it is required to encapsulate different types of cells, as an active component within a material that releases the drug or conjugate directly on the tumor or in the affected area. Against this backdrop, the main objective of this work is to explore the state of participation of polymeric materials in medical and pharmaceutical sciences, in a context where recent cancer statistics are provided in some countries. From the review of the literature, it is evident the importance of the synthesis of new materials or polymeric conjugates, because these materials at the beginning have been used only as storage and delivery systems of drugs, but today they are used as direct treatment against diseases such as cancer, that is, as bioactive agents. Finally, it is possible to conclude that the conjugated polymer-proteins or polymer-drugs, currently on the market and others in the clinical research phase, these materials present physical properties such as biocompatibility and biodegradability, that is, compatibility with the living organism.

Biodegradable thermosets polymers as an alternative solution to pollution generated by plastics

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Abstract. In this research work, a description was made of thermoset polymer materials and their relationship with the environment. The traditional thermoset manufacturing processes make their recycling and reuse complicated. Consequently, most products made with this type of material end up accumulating in landfills and their disposal generates a high environmental impact. This is why a description of thermoset and biodegradable polymers is made to identify the differences between them and the advantages of biodegradable materials. This being so, it is found that the scientific community presents as a proposal or alternative solution to this environmental problem the development of new methodologies and technologies to synthesize families of thermoset biodegradable materials, as for example the case of "glycix", "titan" and "hydro", and that from capital investment in science and technology processes in the area of materials engineering, by the productive sector and Universities of countries such as for example; Mexico and Argentina, managed to develop on an industrial scale biodegradable resins that can be processed by all conventional plastic molding methods and significantly reduce the carbon footprint.

Percepción de la contratación de personas en situación de discapacidad en el centro comercial Ventura Plaza.

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Abstract. Describir la percepción que tienen los comerciantes con respecto a la contratación de personas en situación de discapacidad específicamente en el Centro Comercial Ventura Plaza de la ciudad de Cúcuta. La investigación es formativa cuantitativa y de tipo descriptivo. La población corresponde a los locales del Centro Comercial Ventura Plaza y la información recolectada dará a conocer cómo perciben los dueños y/o administradores de los locales la posibilidad de contratar personas en situación de discapacidad e identificar aquellas labores en las que están incluidas o se pueden incluir estas personas. La inclusión se asume para esta investigación como la participación activa de personas en situación de discapacidad y como la oportunidad de crecer y enriquecernos como sociedad con las diferencias individuales. El centro comercial se encuentra en una zona céntrica de la ciudad con amplias vías de acceso cuenta con locales destinados a la venta de calzado, ropa deportiva, casual y formal, accesorios, entre otros también posee una plazoleta de comidas con sus respectivos locales, adicionalmente cuenta con una zona de negocios en la que se encuentran varias oficinas privadas en las que podemos encontrar varias empresas, firmas de abogados, empresas constructoras, etc. Con esta investigación se espera propender por la vinculación laboral de personas en condición de discapacidad que quieran vincularse en algún tipo de actividad en este centro comercial por parte de los dueños y/o administradores de los diferentes locales comerciales.

Rasgos característicos de las principales especies arbóreas de la Universidad Francisco de Paula Santander.

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Abstract. Este trabajo tiene como objetivo analizar las características de las distintas especies arbóreas por sectores de la Universidad Francisco de Paula Santander (UFPS) sede Cúcuta. La investigación se desarrolla bajo el enfoque cuantitativo de nivel descriptivo, donde se realiza una recolección de parámetros de los árboles: diámetro a la altura del pecho (DAP), altura y especie; desde el inventario arbolado UFPS, luego se hace el respectivo contraste de la información para ser organizada y así efectuar los respectivos análisis estadísticos, los cuales demuestran que la gran mayoría de los arboles estudiados pertenecen a los menores intervalos del DAP en centímetros, de igual manera la mayoría de los arboles miden menos de 21 metros de altura. Se evidencia una mayor presencia de la especie *licanea* tomentosa comúnmente denominada "*ohiti*", a diferencia de las demás especies arbóreas que presentan porcentajes mínimos. Cabe señalar que estudios anteriores manifiestan que los parámetros del DAP, altura y la especie de los árboles están relacionadas de forma cuantitativa y análogas con el volumen, factores de forma, la biomasa, entre otros.

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