C O N T E N T S
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Mathematics

THINWALLED PANEL FINITE ELEMENTS IN SHEARING STRESS ANALYSIS OF THIN WALLED BEAM-TYPE

Josip BRNIĆ, Marko ČANAĐIJA, Domagoj LANC, Goran VUKELIĆ

Abstract. As it is known exist many types of engineering structures. According to the modern design, e.g. using computer procedure, as well as to the requirement of low prices, the optimal structure design will be reached using an iterative numerical procedure. Between mentioned type of structures, very often thin walled beam-type structures are those that come into the consideration. In this paper a very powerful tool for shearing stress analysis of thin walled beams is given and for justification some examples are shown.

Address: **J. Brnic, Ph. D.,** University of Rijeka, Department of Engineering Mechanics, Faculty of Engineering, Vukovarska 58, HR-51000 Rijeka, CROATIA.

SOME REMARKS ABOUT NUMERICAL INTEGRABILITY ON THE HEISENBERG LIE GROUP H(4) *(I)*

Anania ARON, Camelia ARIEŞANU

Abstract. The goal of our paper is to make a comparison between two numerical integrators and to point out their properties on the Lie group H(4).

Address: **A. Aron , C. Arieşanu,** „Politehnica" University of Timişoara, Department of Mathematics, P-ţa. Victoriei, No. 2, Et. 2, 300006 – Timisoara, ROMANIA

SUPERDENSE POINTWISE UNBOUNDED DIVERGENCE WITH RESPECT TO STURM-LIOUVILLE NODE MATRICES

Alexandru I. MITREA

Abstract. The main result of this paper refers to the topological structure of the set of unbounded divergence of some interpolating operators related to a problem of Sturm-Liouville type.

Address: **Alexandru I. Mitrea**, Technical University of Cluj-Napoca, Department of Mathematics, 400020 Str. E. Isac 15, E-mail: alexandru.ioan.mitrea@math.utcluj.ro, alex53mit@yahoo.com

REGARDING THE PARATRIGONOMETRIC EQUATION OF THE CIRCLE

Malvina BAICA, Mircea CÂRDU

Abstract. In this paper the authors establish empirical relations, for each individual quadrant, of the four trigonometric circle quarters (of radius R=1). These four relations (referring on a coordinates system Ox-Oy with the axis

Ox and Oy tangent at the circle) together, can replace the known classical equation of trigonometric circle (referring on a coordinates system Ox-Oy with the origine in the center of the circle).
Keywords and phrases: Classical Trigonometry, Paratrigonometry.

Address: **Malvina BAICA,** The University of Wisconsin, Dep. of Mathematical and Computer Sciences, 53190, Whitewater, WI, U.S.A
        Mircea CÂRDU, S.C. HERBING S.R.L., 9 Str. Oţetari, Sector 2, Bucharest, ROMANIA

APPROXIMATION MODELS AND ALGORITHMS BASED ON NEURAL NETWORKS

Nicolae POPOVICIU

Abstract. The work gives a description of exact models and approximation models. The third case is based on neural networks with radial basis function approach.

Address: **Nicolae POPOVICIU**, Sos. Colentina, Nr. 25/A, Ap. 7, Cod 021156 BUCUREŞTI

ON EXPONENTIAL TRICHOTOMY OF SEMIGROUPS OF LINEAR OPERATORS

Mihail MEGAN and Larisa BULIGA

Abstract. The aim of this paper is to give necessary and sufficient conditions for exponential trichotomy of semigroups of linear operators.
      Keywords and phrases: semigroup of linear operators, exponential trichotomy.

Address: **M. Megan, L. Buliga,** Faculty of Mathematics and Computer Science, West University of Timisoara, ROMANIA.

ON BACKWARD DIFFERENTIAL EQUATIONS BY MCSHANE TYPE

Romeo NEGREA, Horia CÂRSTEA

Abstract. In this paper we shall establish a new theorem on the existence and uniqueness of the adapted solution to a backward stochastic differential equation by McShane type under some weaker conditions that the Lipschitz one. The motivation for the study is a similar Black-Scholes type model in mathematical finance and the control of an electronic circuits with stochastic resonance.
      Keywords and phrases: belated integrals, McShane stochastic differential equations, backward stochastic differential equations, financial modeling, stochastic resonance.

Address: **R. Negrea** „Politehnica" University of Timişoara, Department of Mathematics, P-ţa. Victoriei, No. 2, Et. 2, 300006 – Timisoara, ROMANIA

ON SOME NEW GENERALIZATIONS OF CARLSON'S INEQUALITIES

Emil C. POPA

Abstract. We give some generalizations of Carlson's inequalities and a related result.
      Keywords and phrases: Carlson inequality, Holder inequality, Minkowski inequality.

Address: **E. C. Popa** „Lucian Blaga" University of Sibiu, Department of Mathematics, Str. Ion Rațiu, No. 5-7, 550012 – Sibiu, ROMANIA, E-mail: emil.popa@ulbsibiu.ro

SOME CLASSES OF BRANDT GROUPOIDS

Vasile POPUȚA

Abstract. In this paper some types of Brandt Groupoids are given and some of their properties are studied. Particulary, the Cryptographic Groupoid is obtained.

Keywords and phrases: groupoid, groupoid of type (p, q) over a ring, cryptographic groupoid, opposite of groupoid, kernel, inner morphism, inner automorphism.

Address: **V. Popuța,** West University of Timișoara, Departament of Mathematics, Bvd. Vasile Pârvan, No. 4, Et. 2, 300223 – Timișoara, ROMANIA

JAVA FOR APPROXIMATING A SHIP'S CROSS SECTION

Camelia CIOBANU, Marian CAȚĂ,
Arlette-Rabela ANGHEL

Abstract. The ship hull form have been described by the well-known classic Lewis transformation, Lewis [6] in 1929, and by an Extended-Lewis transformation with three parameters, as given by Athanassoulis and Loukakis [1] in 1985, with practical applicability for any types of ships. We present here an algorithmic method solving directly the problems that appear in naval architecture domain concerning the contour of ship's cross-section. The application was made in Java language and creates both a text file and a graphical chart.

Keywords and phrases: hydrodynamic, ship cross section, Lewis transformation, area of the cross section.

Address: **C. Ciobanu, M. Caţă, A. R. Anghel**, "Mircea cel Bătrân" Naval Academy, IT Departament, Fulgerului Str. 1, E-mail: mcata@anmb.ro; cciobanu@anmb.ro; aanghel@anmb.ro

RELATIVELY INERTIAL DELAYS

Şerban E. VLAD

Abstract. The paper studies the relatively inertial delays that represent one of the most important concepts in the modeling of the asynchronous circuits.

Keywords and phrases: delay, asynchronous circuit, relative inertia.

Address: **Ş. Vlad**, Str. Zimbrului, Nr. 3, Bl. PB68, Ap. 11, 410430, Oradea, ROMANIA, E-mail: serban_e_vlad@yahoo.com

ALMOST PERIODIC MULTIFUNCTIONS
WITH VALUES IN GENERALIZED UNIFORM SPACES

Nicolae CRIVĂȚ

Abstract. For multifunctions with values in generalized uniform spaces the almost periodicity is defined. Some properties of such multifunction and relationships between almost periodicity and uniform continuity are given.

Address: Nicolae CRIVĂȚ, "Politehnica" University of Timişoara, Departament of Mathematics, P-ța. Victoriei, No. 2, Et. 2, 300006 – Timişoara, Romania

ALGORITHM FOR NUMERICAL SOLUTION OF HIGHER ORDER POISSON EQUATIONS

Pavel NĂSLĂU

Abstract. In this paper we give an algorithm for numerical solution of the mixed problem for higher order Poisson equations following a generalization of direct boundary element method to this problem.

*Keywords and phrases***:** higher order Poisson equations, mixed problem, direct boundary element method, algorithm.

Address: Pavel NĂSLĂU, "Politehnica" University of Timisoara, Departament of Mathematics, P-ta. Victoriei, No. 2, 300006 – Timisoara, ROMANIA

Physics

LAMELLAR NON – IMAGING CONCENTRATOR WITH DIEDRAL ANGLE

Ioan LUMINOSU

Abstract. The lamellar non – imaging concentrator with diedral angle which is graphically designed.

The concentrator uses polyester lamellas on which a layer of aluminium is placed by a process of vacuum evaporation.

The reflected surface has an area of A_R= 2968 cm^2 while the area of the aperture is A_p=1225 cm^2. The concentrator factor has a value of 5.4.

The efficiency of the mirror up to reaching a temperature of 120° C is 0.29.

Keywords: non – imaging, concentrator, diedral angle, truncated pyramid.

Address: Ioan LUMINOSU, "Politehnica" University Timisoara, Department of Physics, P-ta. Regina Maria No. 1, 300004, Timisoara, Romania

THE EVALUATION OF THE POSSIBLE PHYSICAL DIMENSIONS OF THE LARGE NATURAL KUIPER BELT OBJECTS(PLANETOIDS) BEYOND PLUTO

Zoran B. TODOROVIć

Abstract. The possible orbits beyond Pluto have been constructed in terms of Pluto's parameters and the fine structure constant.The evaluations of the possible physical dimensions of large new discovered planetoids (2003US2, 2009GU9, 2001KX76, 2002UX25, 2002TX300, 2002WR106, 2002LM60, 2002AW197, 2001UR163, 2002TC302, 2003VB12) within the Classical Kuiper belt, has been made. Using proposed theoretical approach have been fited Sedna's diameter and its semimajor axis with respect to its location. The space beyond Pluto is parted into several clusters with equal length has been shown.It seems that Pluto is not a planet of Solar system, while it naturally belongs to the Kuiper belt objects.

Key words: solar system, planetary orbits, Kuiper belt objects, fine structure constant

Address: **Zoran B.TODOROVIć,** Faculty of Natural Sciences, Department of Physics, Univ. of Prishtina, Serbia Republik

A CRITICAL VIEW CONCERNING IMAGE ERECTORS

Marius COSTACHE, Corina GRUESCU

Abstract. The paper describes basic optical assemblies used to erect image and defines quality criteria. Two types of prismatic erectors and three types of lens erectors are studied as alternatives for a complex optical system needing erect final image. The alternatives and the criteria are mathematically analyzed using software Electre III. The final ranking provided by the program allows the user to make the best choice.

Address: **Marius COSTACHE,** University Politehnica of Timisoara, Physics Department, Piața Regina Maria nr.1, tel.: +40-256-403091,

Corina GRUESCU, University Politehnica of Timisoara, Mechanical Faculty, Mechatronics Department, Bd. Mihai Viteazu nr.1, tel.: +40-256-403557,

I R ABSORPTION IN THE TERNARY SYSTEM OF ISOMORPHOUS Me$_2$O$_3$ OXIDES

Minerva CRISTEA, Viorel CHIRITOIU, Marius COSTACHE

Abstract. The experimental results concerning the infrared absorption spectra (400-4000 cm^{-1}) of samples with 50% mol α-Fe$_2$O$_3$ from the isostructural oxides α-Fe$_2$O$_3$, α-Cr$_2$O$_3$, α-Al$_2$O$_3$ ternary system are presented and discussed. The IR spectra were obtained by using powdered samples tablet formed with KBr, at room temperature. Some investigated samples are solid solutions and the others contain two phases and these belong to gap miscibility from the ternary system. All spectra exhibit two absorption bands below 700 cm^{-1} that are larger for samples from gap miscibility.

Address: **Minerva CRISTEA**, Univ. "Politehnica" Timişoara, P-ţa Regina Maria Nr.1 Timişoara,
Viorel CHIRIŢOIU, Univ. "Politehnica" Timişoara, P-ţa Regina Maria Nr.1 Timişoara,
Marius COSTACHE, Univ. "Politehnica" Timişoara, P-ţa Regina Maria Nr.1 Timişoara,

OPTICAL AND ELECTRICAL MODELING OF MULTIPLE QUANTUM WELL SOLAR CELLS

Marius PAULESCU, Paul GRAVILA, Eugenia TULCAN-PAULESCU

Abstract. This paper surveys a new concept of photovoltaic converters that are subject of nanoscale science: Multiple-Quantum-Well (MQW) solar cells. We propose a simplified but accurate theoretical model of absorption coefficient for direct bandgap III-V alloys as starting point of MQW optical modeling. A model of MQW solar cell in p-i-n architecture is derived inside detailed balance theory. Using this model, the dependence of the cell performance on the number of wells, barrier composition and the effect of i-region thickness can be investigated. As an example, the estimate of the maximum efficiency that can be achieved for a proposed architecture is given.

Address: **Marius PAULESCU, Paul GRAVILA, Eugenia TULCAN-PAULESCU,** Physics Department, West University of Timisoara, V. Parvan Ave. 4, 300223 Timisoara, Romania