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Contents and Abstracts

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ABSTRACTS

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Mathematics

TODAY'S STATUS OF THE FERMAT'S LAST THEOREM

Malvina BAICA

Abstract. In this paper the author will show that G.Faltings finished the proof of (ELFLT) using deformations instead of higher levels of the Euler Systems on March 1995. Also, the author used the Baica's Generalized Euclidean Algorithm (BGA) as the only Euler System of the Algebraic Number Theory and proved (EFLT) on April 1994. We will show that (ELFLT and (EFLT) are equivalent but the functor to show that they are the same can not be produced.

Keywords: Fermat's Last Theorem, Euclidean Fermat's Last Theorem

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L'ÉQUATION DIOPHANTIENNE (I)

Gheorghe M. TUDOR

Résumé. Dans ce travail, sur l'équation signalée plus haute, nous envisagerons quelques questions relatives aux solutions contenant des nombres entiers positifs. En ce qui concerne cette équation, on peut la considérer comme une extension (à gauche) de l'équation $x^x\, y^y = z^z$ (voir, par exemple [1]). Nous nous proposons de généraliser certaines résultats obtenus dans ce qui concerne la résolution de l'équation $x^x \cdot y^y = z^z$

Keywords: Équation Diophantienne

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ON THE CONVERGENCE OF SUCCESSIVE APPROXIMATIONS FOR McSHANE STOCHASTIC INTEGRAL EQUATIONS AND FINANCIAL APPLICATION

Romeo NEGREA

Abstract. The existence and pathwise uniqueness results for solutions of McShane's stochastic integral equations without assuming a Lipschitz condition on the coefficients are presented. An application to financial modelling in the general conditions is given.

Keywords: Stochastic integral equation of McShane type, belated McScane's integrals financial modelling.

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DUALITY AND THE GALOIS CONNECTION BETWEEN TWO CONVEXITY SPACES

Gabriela CRISTESCU

Abstract. The dualities between two convexity spaces, according to the definition of Kay and Womble, are studied. Representation theorem are derived, using the corresponding terms coming from the lattice generators. An approach to the Galois connection between two convexity spaces has as the main results its equivalence with the duality theory.

Keywords: Convexity space, duality between two convexities, Galois connection.

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PROPERTIES OF UPPER AND LOWER θ - CONTINUOUS MULTIFUNCTIONS

Takashi NOIRI, Valeriu POPA

Abstract. In this paper we obtain new characterization of upper an lower θ - continuous multifunctions and investigate several properties of such multifunctions.

Keywords: θ - continuous Multifunctions

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SOME PROPERTIES AND APPLICATIONS OF A MODIFIED KOVARIK ALGORITHM

Constantin POPA

Abstract. In a previous paper we presented a modified version of Kavarlik's approximate orthogonalization algorithm for arbitrary symmetric matrices. In the present one, we analyse some of its properties. The first part of the paper deals with a result concerning the linear convergence of the algorithm, while in the second one we apply it for numerical solution of consistent linear least-squares problems of which matrix is symmetric. The basic idea is to modify also the right hand side of the problem during the transformation of the matrix. We prove that sequence of vectors generated in this way converges to the minimal norm solution of the problem. Some

applications are also pressented for a collocation discretization of a "model problem" first kind integral equation.

Keywords: symmetric Kovarik algorithm, linear convergence, symmetric least-squares problems, first kind integral equations.

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ONE REMARK ON (K(M-1)+1) – GROUPS

Janez UŜAN, Mališa ŽIŽOVIC

Abstract. In this article (k(m-1)+1) – groups for $m > 2$ and $k \geq 2$ are described using one (k+1) – group, one k – ary operation and one (k-1)-ary operation.

Keywords: n-group, nHG-algebra

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QUAD-TREE CONSTRUCTION FOR ORDERED DITHERING MASK

Radu Lucian LUPŞA

Abstract. Rendering greyscale images on printers transforming images form greyscale to bi-level black and white. Ordered dithering is the fastest algorithm for this transformation. It has been made popular with the blue noise mask algorithm. We propose here a novel algorithm for producting the mask for ordered dithering.

Keywords: greyscale images, mask algorithm.

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BI-(φ, ψ) CONVEX-CONCAVE FUNCTIONS

Dorel I.DUCA, Liana LUPŞA

Abstract. An extension of the concept of convex function is given in a very general framework provided by a set in which a general convexity for its subsets is defined.

Keywords: generalized convex functions, generalized partial convex functions.

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SOME PROPERTIES OF FRAMES IN HILBERT SPACES

Paşc GĂVRUȚĂ

Abstract. We give some characterizations in the frame theory in connection with the operator $L_{XY}x = \sum_{n\in I}\langle x, x_n\rangle y_n$. We prove also a Welch – type inequality for Besel sequences in finite – dimensional Hilbert spaces. It is proved that a Bessel sequence is a Welch sequence if and only if the sequence is a tight frame.

Keywords*:* frame theory, Hilbert spaces.

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CONTROLLED MAXIMUM ENTROPY METHOD OPTIMIZATION OF THE INITIAL NETWORK TOPOLOGY AND ROUTING

Milan TUBA

Abstract. Suitability of the MEM (Maximum Entropy Method) to the network design problem has been investigated [5] and mathematical model for its application has been developed [7]. Further improvements are developed in [8]. That model determined variable and constraints that satisfy MEM formalism and give feasible initial routing. Improvements that allow control of the optimization process are introduced in this paper. Limitation of the MEM that no variable can become equal tp zero is eliminated

Keywords: Network Design Problem, Network Topology, Routing, MEM.

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Physics

THE PHYSICS BEHIND THE PHASE INVARIANCE DERIVATION OF DOPPLER SHIFT FORMULAS

Bernhard ROTHENSTEIN, Ioan ZAHARIE

Abstract. It is shown that the derivation of Doppler shift formulas using the invariance of the phase, obscures the fact that the calculation of the circular frequency $\omega=2\pi/T$ requires the same time interval as the measurement of the velocities present in such formulas. If the velocities of source and receiver are constant, the time

intervals are finite. If not, we work with instantaneous velocities and so the involved time intervals are "very small" the periods being of the same order. Under such conditions, we make the "very small" period approximation.

Keywords: Doppler shift,

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DETERMINATION OF CONTROLLABLE VARIABLES OF FLAT-PLATE SOLAR COLLECTOR BZ DIGITAL SIMULATION CONSIDERING THE EFICIENCY CRITERION

Ioan LUMINOSU

Abstract. The efficiency equation of conventional solar collector of the type plate-tube, established on some simplifying hypotheses is expressed by the dependence $\eta = f(\alpha, \beta, (\tau\alpha)_{ef})$, where $\alpha = A_c \cdot U_L$, $\beta = \dot{m} \cdot C_p$

The graph of the dependence $\eta = f(\alpha, \beta, (\tau\alpha)_{ef})$ on the axes η, α, β with $(\tau\alpha)_{ef}$, as parameters, leads to the three-dimension picture of the efficiency. The computer designs the surface point by point and displays the values of variables. From the values list, the user chooses the values α and β depending on the desired efficiency. Then by relation of definition he establishes the operational, geometrical and the material parameters of the collector.

The results of the digital model are compared to the experimental data obtained on a collector with air, for witch $T_{f,I} = T_a$, $W = 0$, $F' = 1$, $u = 1$.

Keywords: solar collector,

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AN ANALYSIS OF THE CLASSICAL DOPPLER EFFECT REVISITED

Bernhard ROTHENSTEIN, Ioan DAMIAN

Abstract. Acoustic Doppler shift formulas, free of assumptions concerning how large is the distance between source and receiver or how large the frequency is, are derived. Subsonic, sonic and supersonic velocities are considered. It is shown that the Doppler factor is non-linear.

Keywords: Doppler shift, Doppler factor

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SHIFT OPERATORS OF THE (d+1) – DIMENSIONAL RELATIVISTIC ROTATING OSCILLATORS

Nicolina POP

Abstract. The super symmetry of the models of quantum relativistic rotating oscillators in arbitrary dimensions, defined as Klein-Gordon fields in backgrounds with deformed anti-de Sitter metrics, is presented pointing out the supersymmetric operators. We calculate the shift operators: the raising and lowering operators for these models using the action of the supersymmetry operators and the form of the normalized radial fundation of the (d+1)-dimensional rotating oscillators. The shift operators are different from those of the supersymmetry, they are not pure differential operators and they are not adjoint to each other.

Keywords: differential operators

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SOME ASPECTS OF THE MAGNETIC BEHAVIOUR OF MnZn FERRITE

I. HRIANCA, M.CRISTEA, V.VILCEANU, M.FEDER, M.BOLDAN, A.ZAMFIR

Abstract. Rotational hysteresis is the discontinuous remagnetization phenomena of a ferromagnetic substance which rotates uniformly in a magnetic field or which exists in a rotating magnetic field. The following goals are presented in the paper : a) the experimental effect curves-induced voltage U Depending on the intensity of magnetic field H(O-90KA/m), at a constant rotating frequency ; b) Dependence of the induced voltage U on the rotating frequency f of the samples (10-35rot/s) in a constant magnetic field. We elaborated Mn0,54Zn0,37Fe2,06O4 ferrite with the addition of Bi_2O_3 in different proportion, by the conventional ceramic technique. It was followed the influence of samples 'peculiarities on effects curves with samples into disk shape .It can be noticed that the rotational effect intensity increases with Bi_2O_3 content. The new information on the behaviour of the rotates ferrite in magnetic field can be used in the optimisation of ferrite technology and their applications.

Keywords: rotational hysteresis, MnZn ferrite

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