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# *ABSTRACTS*

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## Mathematics

### GEOMETRIC STRUCTURES ASSOCIATED TO SOME DYNAMIC SYSTEMS


**Monica CIOBANU**



**Abstract.** Having been given an implicit second order differential system on a smooth manifold M, suitable geometric structures are considered on the configuration space. The coefficients of the variational forms and of the adjoint forms, associated to the system, define these structures.



**Keywords**: dynamical systems, nonlinear connexions.



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### NEW GENERALIZATIONS OF CAUCHY'S FUNCTIONAL EQUATION


**Borislav CRSTICI, Dan DAIANU**



**Abstract** – In this paper we solve the functional equations: $|\alpha f(x + y)| = |\beta f(x) + \gamma f(y)|$, and $|\alpha f(x + iy)| = |\beta f(x) + \gamma f(iy)|$, where $\alpha$, $\beta$, $\gamma$ are arbitrary complex constants x, y are real variables, and f is an unknown entire function of a complex variable.



**Keywords:** complex variable.



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### L'EQUATION DIOPHANTIENNE $\left(x_1^{x_1}\right)^{m_1} \cdot \left(x_2^{x_2}\right)^{m_2} \ldots \left(x_k^{x_k}\right)^{m_k} = y_k^{y_k}$ II


**Gheorghe M. TUDOR**



**Résumé** - Sur l'équation signalée plus haut, nous avons en vue quelques questions relatives aux solutions contenant des nombres entiers positifs. Au sujet de ce problème nous envisagerons les résultats obtenus dans le travail [1]. Pour être plus clair, nous pouvons préciser que l'équation considérée plus haut est plus générale que l'équation $x_1^{x_1} \cdot x_2^{x_2} \ldots x_k^{x_k} = y_k^{y_k}$ laquelle a été cherchée dans [1]. Dans cet ouvrage, on va

continuer l'étude effectuée sur l'équation rappelée plus haut. Le problème essentiel réside au fond, dans le fait qu'on détermine effectivement des solutions exprimées par des nombres entiers positifs pour l'équation plus générale, $\left(x_1^{x_1}\right)^{m_1} \cdot \left(x_2^{x_2}\right)^{m_2} \ldots \left(x_k^{x_k}\right)^{m_k} = y_k^{y_k}$ .

**Keywords:** L'équation Diophantienne.

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## SOME ASPECTS RELATED TO THE DISCRETE ANALOGUE OF DIFFERENTIAL AND INTEGRAL EQUATIONS

**Andrei VERNESCU**

**Abstract**. Some linear recurrence equations with variable coefficients, satisfied by certain particular sequences of real numbers, has the property to determine uniquely not only the sequence-solution but also the value of the first term. This situation was emphasized in four examples proposed by Professor A.Lupaş and me. In the present work we give a theoretical statement for this matter.

**Keywords**: linear recurrence equations.

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## nHG-ALGEBRAS AS ALGEBRA OF THE TYPES <2, 1, 1, 1, 0, 0> WITH LAWS

**Janez USAN, Malisa ZIZOVIC**

**Abstract.** In this article nHG-algebras are described as algebras of the type <2, 1, 1, 1, 0, 0> with laws .

**Keywords**: n-group, nHG-algebra.

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## THE BINARY GOLDBACH PROBLEM

**Malvina BAICA, Aldo PERETTI**

**Abstract**. In this paper authors will present the results of Baica's paper "Clarifications of the Author's Previous paper in the Goldbach Conjecture" in a slightly different form and correct some misprints in it.

**Keywords**: Goldbach Conjecture.
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**Aldo PERETTI**, University of Buenos Aires, ARGENTINA.

## A CRITERION FOR PSEUDOSUBMEASURABLE FUNCTION

**Octavian LIPOVAN**

**Abstract**. In [3] the pseudosubmeasurable function concept is defined and some properties of this concept are studied. In this paper, using the notion of control submeasures, there are introduced a criterion of functions pseudosubmeasurability .
**Keywords**: Pseudosubmeasurable function, submeasure.
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## DISTRIBUTIONAL FUNCTIONAL IDENTITIES CHARACTERIZING POLYNOMIALS

**Mihai NEAGU**

**Abstract**. In this paper it is studied certains distributional functional identities which characterize polynomials. In distributions, the fixation of variables is an irregular operation. In its place we will use the direct section of distributions which is a regular operation in distributions.
**Keywords**: Distributional functional identities
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## ON A PROPERTY OF MINIMAL SETS OF A HOMEOMORPHISM

**Constantin BOTA**

**Abstract**. S.Matsumoto and M.Shishikura ([4]) aborded the study of minimal sets of a homeomorphism $f : S^1 \times \mathbf{R}$. We consider here a homeomorphism $f:X \to X$, X an arbitrary topological space. We will show that if $M \subset X$ is a minimal set for f and contains an interior point then all points of set M are interior points.
**Keywords:** Dynamical system, minimal set.

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## SOME REMARKS ON THE LYAPUNOV-MALKIN THEOREM (I)

**Anania GÎRBAN**

**Abstract**. The Lyapunov-Malkin theorem is discussed and some of its applications are pointed out.

**Keywords**: Lyapunov-Malkin theorem.

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# Physics

## ON THE CRYSTALLIZATION KINETICS OF $Fe_{60}Gd_{10}Cr_{10}B_{20}$ AMORPHOUS ALLOYS

**Ioan ZAHARIE**

**Abstract**: In the present paper the non-isothermal crystallization kinetics of $fe_{60}gd_{10}cr_{10}b_{20}$ amorphous alloys is investigated by differential thermal analysis (dta). The crystallization of $fe_{60}gd_{10}cr_{10}b_{20}$ amorphous alloys has been realized through four processes characterized by the activation energies $\varepsilon_1 = 1.25 \pm 0.14$ ev, $\varepsilon_2 = 2.23 \pm 0.18$ ev, $\varepsilon_3 = 4.83 \pm 0.04$ ev, $\varepsilon_4 = 4.29 \pm 0.69$ ev. By x-ray diffraction (xrd) we established the crystalline phases which appeared in the non-isothermal crystallization process: feb, $fe_2b$, $fe_3b$, $fe_2gd$, $gd_2b_5$, crb.

**Keywords**: Amorphous alloys, Thermal analysis, Non-isothermal crystallization, X-ray diffraction

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## RELATIVISTIC DOPPLER EFFECT FREE OF "PLANE WAVE" AND "VERY HIGH" FREQUENCY ASSUMPTIONS

**Bernhard ROTHENSTEIN, Ioan DAMIAN**

**Abstract.** We show that a free of assumptions approach to the Doppler effect (plane wave and "very small" period assumptions) leads to a Doppler factor which depends on the involved frequencies. The result is that the Doppler effect shifts differently the different frequencies present in the studied electromagnetic radiation.

**Keywords**: Doppler effect

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## THE QUANTUM STATISTICS OF THE CHEMICAL REACTIVITY. PART II: FOKKER-PLANCK PATH INTEGRAL DENSITY FUNCTIONAL RATE EQUATION FORMULATION

**Mihai V. PUTZ**

**Abstract.** The envisaged study likes to apply and to extend the recent Fokker-Planck path integral representation of markovian processes *(H. Kleinert, A. Pelster, and M. V. Putz, Phys. Rev. E, 65, 066128/1-7, 2002)* to rate equation calculation for electronic and biological systems providing an accurate theoretical prediction of their reactivity. The reliability of the present research scheme is further sustained by the recent success of the computation of new atomic radii and related periodic properties (*M. V. Putz, N. Russo, and E. Sicilia, J. Phys. Chem. A, 107, 5461-5465, 2003*) on the base of the same chemical potential formulation as is in this project involved.

**Keywords:** quantum statistics

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## MECHANICAL OSCILLATIONS IN CYLINDRICAL QUANTUM NANO DOTS

**Vjekoslav SAJFERT, Maja GARIĆ, Jovan P. ŠETRAJČIĆ, Bratislav S. TOŠIĆ**

**Abstract.** Green function technique, suitable for analyses of spatially deformed structures, is developed in this paper and applied to phonon system. Some thermodynamical and kinetical phonon properties of cylindrical quantum dots are analysed using developed method. By application of advanced Green function method it was shown that physical characteristics of quantum dots are spatially dependent. It was illustrated using diffusion coefficient and crystal density as illustrative example.

**Keywords:** mechanical oscillations

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# THERMODYNAMIC PROPERTIES OF RELATIVISTIC FERMION OSCILLATORS

**Nicolina POP**

**Abstract**: The partition function and the grand-canonical potential characterizing relativistic fermionic oscillators are established by restoring to the conversion of sums into integrals and by numerical methods. Thermodynamic properties such as the specific heat, the pressure and the number of particles are presented in some more detail.

**Keywords:** Relativistic fermionic oscillators, partition function, thermodynamic properties

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