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STOCHASTIC STABILITY OF A PERTURBED LORENZ SYSTEM

Gheorghe ȚIGAN

Abstract. In this work we are concerned with stochastic stability of a randomly perturbed Lorenz system. A Lyapunov function is proposed and conditions for stochastic stability are pointed out. The work ends with numerical illustrations pointing out stable and unstable in probability points

Keywords and phrases: Lorenz system, stochastic stability, Lyapunov function

MSC(2000): 93E15; 60H10

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CHARACTERIZATIONS OF ALMOST NEARLY QUASI-CONTINUOUS MULTIFUNCTIONS

Takasi NOIRI and Valeriu POPA

Abstract. Recently, Rychlewicz [32] introduced the notion of almost nearly quasi-continuous multifunctions as a generalization of almost nearly continuous multifunctions [12] and quasicontinuous multifunctions [6] and [7]. In this paper, we obtain the further characterizations and some properties of almost nearly quasi-continuous multifunctions

Keywords and phrases: multifunction, N -continuous, quasi-continuous, almost nearly quasi-continuous

MSC(2000): 54C08, 54C60

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NEW CONTRIBUTIONS ON AN OPTIMAL CONTROL PROBLEM IN \mathbb{P}^3

Ciprian HEDREA, Romeo NEGREA, Ioan ZAHARIE

Abstract. We study an optimal control problem on \mathbb{R}^3 and point out some of its properties. Also, in this direction, we analyze a physical problem in the domain of solitary waves.

MSC (2000): 34H05

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MATKOWSKI CONTRACTIONS AND HYERS – ULAM STABILITY

Laura GĂVRUȚA

Abstract. We use the Matkovski's fixed point theorem to obtain a new general result concerning the Hyers-Ulam stability of a functional equation in a single variable.

MSC(2000): 39B82, 39b52, 39B62

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ABOUT SOME PARTICULAR CLASSES OF BOUNDED OPERATORS ON PSEUDO-HILBERT SPACES

Loredana CIURDARIU

Abstract. In this paper we denote n -quasicontractions, n -quasi-isometries, n -quasihyponormal and power bounded operators on pseudo-Hilbert spaces, we give some properties and show that a $(T^*T)^\alpha$ -contraction with $0 < \alpha < 1$ is a power bounded operator. Also, some basic properties of a quasi-isometry on pseudo-Hilbert spaces are investigated.

MSC(2000): 13B35

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AN ECONOMICAL GROWTH MODEL WITH TAXES AND EXPONENTIAL UTILITY

Olivia BUNDĂU

Abstract. In this paper, we examine a one-sector, economical growth model with taxes in infinite and continuous time. This economical growth model leads to a control optimal problem. Using the Pontryagin's principle we give the necessary conditions for optimality. We prove the existence, uniqueness and stability of the study state for a differential equations system. Also, we investigate the effects of fiscal policy changes on welfare.

Keywords: Optimization problems, Saddle-point stability, Endogenous growth, Mathematical models applied in economies.

MSC (2000): 49J35, 49K35

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SOME REMARKS ABOUT STABILITY FOR AN OPTIMAL CONTROL PROBLEM ON THE LIE GROUP G_5

Anania ARON, Camelia POP

Abstract. The goal of our paper is to make a comparison between three numerical integrators and to point out their properties for an example of 3-dimensional nonperiodic Toda lattice

Keywords: optimal control, Lie-Trotter algorithm, Kahan algorithm.

MSC(2000): 34H05

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AN APPLICATION CASE OF THE PARATRIGONOMETRIC POLAR COORDINATES

Malvina BAICA and Mircea CÂRDU

Abstract. In this paper we apply the polar coordinates to define a complete denture of a toothed wheel mathematically, using the paratrigonometric function “paratrigonometric sinus” for four values of paratrigonometric order k .

Keywords and phrases: Paratrigonometry, Polar coordinates, Toothed wheels

MSC (2000): 26EXX; 78A99

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ON THE NON-ISOTHERMAL CRYSTALLIZATION KINETICS OF $Fe_{65}Cr_{15}B_{20}$ AMORPHOUS ALLOYS

Ioan ZAHARIE

Abstract The non-isothermal crystallization kinetics of $Fe_{65}Cr_{15}B_{20}$ amorphous alloys is investigated by differential thermal analysis (DTA). The crystallization of $Fe_{65}Cr_{15}B_{20}$ amorphous alloys has been realised through two processes characterized by the activation energies $\varepsilon_{k1} = 2.25 \pm 0.03 eV$ and $\varepsilon_{k1} = 5.20 eV$, respectively. By X-ray diffraction (XRD) we identified the crystalline phases which appeared during the non-isothermal crystallization: Fe- α , CrB, CrB₂, CrB₄, Cr₂B, σ -FeCr.

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THE NUMERICAL STUDY OF THE OPTICAL EFFICIENCY OF THE STATIC CONCENTRATORS

Ioan LUMINOSU, Ioan ZAHARIE, Viorel CHIRIȚOIU, Romeo NEGREA, Bogdan CĂRUNTU

Abstract: In the case of non-imaging paraboloidal statical concentrators placed on buildings roofs oriented to south, south-east or south-west the optical concentration factor is larger than one during the period of day between 08h30min and 16h00min. This paper presents a case study on the relationship between the solar radiation characteristics and the density of the radiant flow on the photovoltaic cell.

Keywords: azimuth, optical efficiency, non – imaging, parabolic, zenith.

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EXPERIMENTAL STUDY OF EXERGETIC EFFICIENCY OF AIR SOLAR COLLECTOR

Ioan LUMINOSU, Laurentiu FARA, Minerva CRISTEA

Abstract: The air solar collector is used for the complementary heating of buildings and for drying industrial items, as for example ceramic or agricultural products – fruits and seeds. During the usage of the collector, the entropy is generated due to friction forces that appear to the air flow through the collector’s serpentine and during its irreversible heating and cooling process. The variation of the exergy efficiency with the flow shows maximum values that determine the optimal functioning regime of

the collector within the given weather conditions. This paper ascertains that in the Romanian insolation conditions, for a collector with an area of 4.2 m^2 , the optimal flow of the working agent is 0.04 kg/s . For this working agent flow, in comparison with other values, the flow of the heat generated by irreversible phenomena has the lowest values at all hours within a day, with a maximum of 2640 W at noon, during the summer.

The maximum exergy efficiency value is $\eta_{\text{ex,max}}=0.197$, in autumn at noon, for flow rate 0.04 kg/s and collecting area 4.2 m^2 .

The study is useful to designers and users of solar thermal systems in Central Europe as well as in other geographical areas where climatic conditions are comparable to those in South-Western Romania.

Key words: exergy, entropy, irreversibility, exergy efficiency.

PACS : 44.15.+a; 47.27Ak

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LUMINESCENCE MECHANISM OF LIGHT AMPLIFYING BY POLYETHYLENE MACROMOLECULES

Jevrem JANJIĆ, Bratislav TOŠIĆ, and Vjekoslav SAJFERT

Abstract: It was experimentally found that the polyethylene foil noticeably amplifies intensity of light, and that amplification is proportional to the foil thickness. It was separated seven lines from mercury lamp and every of them was amplified. This relatively high number of lines can be explained, most probably, by the presence of impurities. The light amplifying can be explained by forming of infinite chains of polyethylene monomers bounded by covalent forces whose potential energies are of the order of light quanta energy. In the chains are forming excitons or solitons whose energies are few time higher than light quanta energies. Their luminescence leads to amplifying of incident electromagnetic quanta.

Keywords: solitons, light amplification, polyethylene, coherent photons

PACS : 42.50.Gy; 71.35.-y; 71.35.Aa; 42.50.Md; 42.65.Tg

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HETEROSTRUCTURED DEVICES SIMULATION VIA QHD MODEL

Eugenia TULCAN-PAULESCU, Marius PAULESCU

Abstract: The paper deals with the electronic transport in nanoscale heterostructured devices within Quantum Hydrodynamic model. It is numerical implemented using a finite-difference discretization and tested in the case of resonant tunneling diode.

Keywords : Quantum Hydrodynamic, Resonant tunneling diode, Finite difference.

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PACS: 73.23.Ad; 73.50.Bk

DYNAMIC MESH MODEL FOR LARGE SIZE MULTI-CRYSTALLINE SILICON INGOTS FOR REDUCING GRIT OCCURRENCE

Yves DELANNOY, Floricica BARVINSCHI, Thierry DUFFAR

Abstract. A time dependent 3D numerical model of the solidification process of large size ingots in the ECM furnaces is realized. We simulate the relative movement of some parts of the furnace and we calculate the thermal gradient and the solidification speed of the Silicon. The comparison between the numerical predictions and the experimental measures shows a good agreement.

Keywords: numerical simulation, silicium, photovoltaic cell

PACS : 44.05.+e

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