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Contents and abstracts

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Mathematics

A GROWTH MODEL WITH STONE-GEARY UTILITY FUNCTION

Olivia BUNDĂU, Adina JURATONI

Abstract. In this paper, we will analyze the mathematical model associated to an economic growth process. This model is a version of the Ramsey model in continuous and infinite time with the Stone-Geary utility function. Mathematical modeling of this economical growth process leads to an optimal control problem with an infinite horizon. The necessary conditions for optimality are given. Using the optimality conditions we prove the existence, uniqueness and stability of the steady state for a differential equations system. Also, we prove that if the subsistence level of per capita consumption is less than the optimal level of per capita consumption then the steady state is a saddle point.

Keywords and phrases: Stone-Geary utility function, mathematical model applied in economy, optimal condition.

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FIXED POINT THEOREMS IN DOUBLE-EDGED FUZZY METRIC SPACES

Ioan GOLET

Abstract. In this paper is given a generalized type of contraction for functions with values into double-edged fuzzy metric spaces. Some coincidence and fixed point theorems for this new type of contraction are proved. The contraction property is given by two contraction functions '1, '2. We have shown that there are at least two infinite families of such contraction functions k,n(t) = knt, k 2 (0, 1), n 2 N and '_(t) = ln(1 + _t), _ 2 (0, 1). So, we have a large elasticity of this contraction property.

Keywords and phrases: ddouble-edged fuzzy metric space, coincidence and fixed point

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INTERPOLATION OF BANACH K–SUBTUPLES

Ilie STAN, Nicolae COFAN, Ovidiu BĂRBĂTEI

Abstract. We extend some interpolation results from K–subcouples to K–subtuples. We give a sufficient and a necessary and sufficient condition that a subtuple to be a K–subtuple.

Keywords and phrases: Interpolation, Banach tuples, Subtuples, K–subtuples

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ON HOMOCLINIC AND CLOSED ORBITS IN THE T SYSTEM

Gheorghe TIGAN, Adalbert KOVACS, Camelia PETRISOR

Abstract. In the present work we investigate the existence of homoclinic and closed orbits in the T system. Under some constraints for the parameters, we prove that the system has neither homoclinic nor closed orbits.

Keywords and phrases: dynamical systems; differential equations; homoclinic and closed orbits.

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ANALYTICAL INVESTIGATIONS OF THE VISCOUS FLOW DUE TO A PLANAR STRETCHING SURFACES WITH PARTIAL SLIP

Remus - Daniel ENE

Abstract. The purpose of this paper is to construct accurate approximate solutions for planar stretching flows with partial slip of a viscous incompressible fluid. The flow is governed by a third-order nonlinear differential equation. In order to find an approximate analytical solutions of the governing equation will apply Optimal Homotopy Asymptotic Method (OHAM). OHAM is very efficient in practice, ensuring a very rapid convergence after only one iteration. The accuracy of this approach by comparing obtained approximate solution with numerical integration results computed by means of the Wolfram Mathematica 6.0 software is illustrate.

Keywords and phrases: planar stretching flow, optimal homotopy asymptotic method, partial slip.

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MATHEMATICAL MODEL, DISCRETE MODEL, INFORMATICS MODEL AND C++ SOURCE PROGRAM FOR SOLVING PARTIAL DIFFERENTIAL HYPERBOLIC EQUATIONS WITH IMPOSED CONDITIONS

Nicolae POPOVICI and Mioara BONCUT

Abstract: A partial differential equation of second order PDE2 with the hyperbolic type is given. The unknown function is denoted $u(x, t)$, where $x \in [0, L]$, $t \geq 0$, $t \in [0, T]$. The PDE2 is related with the rope vibration of a finite length rope 1D. The work presents: the mathematical model, the discrete mathematical model, the informatics model, the C++ source program, the numerical results and print screen.

Keywords and phrases: Partial differential equations, mathematical model, discrete model, informatics model, source program, C++ program, print screen

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INTERPOLATION OF LOCALLY CONVEX *n*+1-TUPLES

Nicolae COFAN, Ciprian HEDREA, Dan LUPULESCU, Ilie STAN

Abstract: We extend some interpolation results from Banach n+1-tuples to more general locally convex n+1-tuples. We also investigate the relation between the interpolation spaces relative to a given n + 1−tuples of locally convex spaces and the interpolation spaces relative to some of its subspaces. 1

Keywords and phrases: Interpolation of locally convex spaces.

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ON THE MEAN CONVERGENCE IN PROBABILISTIC NORMED SPACES

Ioan GOLET

Abstract: In this paper we have proved that the sequence of Bernstein polynomials associated to a continuous function with values into a probabilistic normed space is in mean convergent to that function. We have applied the obtained result to the approximation of a continuous random signal. The results offer a method for constructing of the continuous random signals by a limited number of measurements. In the same time, the results offer a method for the sampling by a constant step of a continuous random signal. 1

Keywords and phrases: probabilistic normed space, mean convergence, Bernstein polynomial, random signal.

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Physics

ANALOGY BETWEEN THE REFRACTION OF 2D ELECTRIC AND MAGNETIC FIELD LINES IN MATERIALS WITH PERMANENT POLARIZATION/MAGNETIZATION

Ioan BERE

Abstract: This paper is a continuation of the paper [6] and shows the more general case of the materials with orthogonal anisotropy, having permanent polarization/magnetization. Is analyzed the formal analogy between the equations describing the refraction of 2D electric field lines in materials with permanent polarization, respectively the equations describing the refraction of 2D magnetic field lines in materials with permanent magnetization; in both cases, the materials have the orthogonal anisotropy. The problem of refractions in anisotropic materials with permanent polarization / magnetization is approached in two variants: with usual (classic) quantities, respectively with new quantities defined by author. 1

Keywords and phrases: orthogonal anisotropy, permanent polarization /magnetization, refraction, formal analogy.

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THE SCATTERING MATRIX DETERMINATION FOR ANTIRECIPROCAL FARADAY EFFECT BASED DEVICES

Constantin BLAJ, Marian GRECONICI, Daniela VESA

Abstract: In this paper are presented two configurations of a physical device which behaves like a gyrator as consequence of the electromagnetic phenomena which take place inside them. To prove it, to integrate it in the antireciprocal category devices, the scattering matrix determination is made, using the general antireciprocity definition on certain Faraday effect based devices.

Keywords and phrases: scattering matrix, Faraday effect, gyrotropic media, anti-reciprocity, gyrator, electromagnetic fields

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