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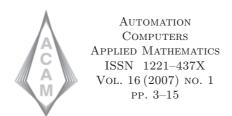
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Selection of Prediction Models for Blood Glucose Regulation in Diabetic Patients

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Abstract: In this contribution, a brief description of competitive prediction models

is given. The use of these models is required in a model-based predictive control algorithm. The static and dynamic characteristics of the models are analyzed in a discussion. Finally, one model is selected for use in prediction

with respect to a conservative strategy in a predictive controller.

KEY WORDS: Diabetes type I, predictive control, nonlinear models, robustness.

RECEIVED: December, 2006



Some Properties of the Stirling Numbers

ULRICH ABEL AND MIRCEA IVAN

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ABSTRACT: We obtain new formulas for the r-associated Stirling numbers and a new

representation of the finite difference of the monomials.

KEY WORDS: Divided difference, Stirling numbers, asymptotic expansion, Bell polynomi-

als.



Efficient Solutions of Multicriteria Fractional Programming Problem

Eugenia Duca

Eugenia Duca: Technical University, Department of Mathematics, Baritiu str. 25-28, 400027 Cluj-Napoca educa@math.utcluj.ro

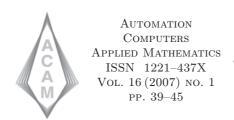
ABSTRACT: For a multicriteria fractional programming problem we investigate the

(weakly) efficient solutions and their relationships in the objective space. When some of the weakly efficient solutions are known, we propose a method to obtain other new weakly efficient solutions in the objective space.

KEY WORDS: Multicriteria fractional programming, efficient solution, weakly efficient so-

lution, solution structure.

MSC 2000: 90C29, 90C32.



Solution Sensitivity for some Parametric Variational Inequality Problems

Daniela Inoan

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ABSTRACT: We study in this paper the sensitivity analysis of solutions for a class of para-

metric variational inequality systems and for a class of variational inequalities that involve set-valued mappings, using a general result for equilibrium

problems.

KEY WORDS: Variational inequalities, systems of variational inequalities, perturbation of

the parameter.

MSC 2000: 49J40, 49Q12.



Numerical Investigations in the Study of Blood Flow Alteration

Ana Măierean

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ABSTRACT: In the current paper we make use of a finite element approximation tech-

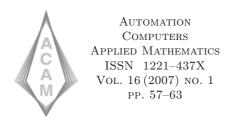
nique, the so called web-method, in order to point out the changes in blood vessel flow, e.g by stenotic lesions, aneurysm, or by-pass operations. An explicit scheme is adapted for this meshless formulation of the laminar incompressible Navier-Stokes equations. Numerical simulations are presented

and discussed.

KEY WORDS: Stenotic lesion, Carotid artery aneurysm, finite elements, meshless method,

web-splines, B-splines.

Received: October 1, 2007



Rough Analysis on Undirected Networks

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Abstract: Rough analysis is a new concept introduced by H. X. Phu since 2001. We

try to develop this concept from undirected networks.

Key Words: r-convergence

MSC 2000: 26B25



The Hypergeometric Operators of First Kind

VASILE MIHESAN

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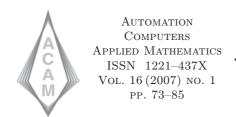
Abstract: In this paper we introduce positive linear operator using the hypergeometric

function $_2F_1$ and the degenerate hypergeometric functions $_1F_1$.

As a particular case we obtain the beta first kind transform and the beta

approximating operators of first kind.

KEY WORDS: Hypergeometric function, beta function, positive linear operators



Nomographical Representation of Functions and Equations with Superpositions

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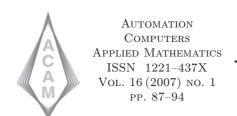
ABSTRACT: This paper carries on the study of nomographical representation of the func-

tions of n variables, $2 \leq n \leq 4$, with superpositions of functions of fewer number of variables. The equations with n+1 variables are also studied. We will also handle the canonical functions forms, as well as the conditions that lead to such functions. It is present concious the nomogram through

those such functions can be represented.

KEY WORDS: Nomogram, nomographical functions, canonical forms.

MSC 2000: 65S05



Mathematical Problems of the Dynamics of an Economical and a Biological System

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Abstract:

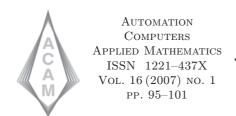
In the paper [18], Wazewska-Czyzewska, M. and Lasota A. gave a simplified model of the dynamics of a system of red blood cells. The model can be described in terms of a nonlinear ordinary differential equation with a delayed parameter.

The properties of the solution of the obtained equation are of interest from both mathematical and biological point of view. In this paper we consider the following problem which appear in the dynamics of an economical and a biological system:

$$x'(t) = f(x(t)) - g(x(t-h)), t \in [0,T]$$

$$x(t) = \varphi(t), t \in [-h,0].$$

where f, g and φ are given functions and h > 0. Existence, uniqueness and data dependence results for the solutions are established by using Picard operator technique (see I.A. Rus [14],[15])



Sturm-Liouville Boundary Value Problems under Nonresonance Conditions

Dezideriu Muzsi

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ABSTRACT: In this paper we establish the existence of weak solutions (in the energetic

space) for a Sturm-Liouville boundary value problem.

RECEIVED: June 1, 2007



Data Dependence for some Functional Differential Equations with both Advanced and Retarded Arguments

ION MARIAN OLARU

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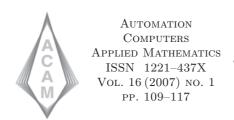
olaruim@yahoo.com

Abstract: The purpose of this paper is to study the equation

$$x'(t) = f\left(t, x(t), \int_{t-h}^{t} x(s)ds, \int_{t}^{t+h} x(s)ds\right) + \lambda, \ t \in [a, b], \ \lambda \in \mathbb{R}.$$

KEY WORDS: Fixed points, data dependence.

MSC 2000: 34H10, 47H10.



Distributed Pharaoh System for Network Routing

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Abstract:

In this paper it is introduced a biobjective ant algorithm for constructing low cost routing networks. The new algorithm is called the *Distributed Pharaoh System (DPS)*. *DPS* is based on AntNet algorithm [2]. The algorithm is using Pharaoh Ant System (PAS)[8] with an extra-exploration phase and a 'no-entry' condition in order to improve the solutions for the Low Cost Network Routing problem. Additionally it is used a cost model for overlay network construction that includes network traffic demands [1]. The Pharaoh ants (Monomorium pharaonis) includes negative pheromones with signals concentrated at decision points where trails fork [10]. The negative pheromones may complement positive pheromone or could help ants to escape from an unnecessarily long route to food that is being reinforced by attractive signals.

Numerical experiments were made for a random 10-node network. The average node degree of the network tested was 4.0. The results are encouraging. The algorithm converges to the shortest path while converging on a low cost overlay routing network topology

KEY WORDS: Network design, heuristics, ant colonies, learning and adaptive systems

MSC 2000: 68M10, 90C59, 68T05

RECEIVED: August 31, 2006



Lagrange Multipliers Method for the Stokes Equation

Alexandru Alin Pohoaţă

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ABSTRACT: The aim of this paper is to make a brief introduction to the Lagrange mul-

tipliers method for the finite element techniques for Laplace operator. The we extend the method to the Stokes equations and solve a practical example

on a square using the Mini-element.

KEY WORDS: Finite element, Stokes equation Steklov-Poincaré operator, Schur comple-

ment, Lagrange multipliers

MSC 2000: 35Q30,65N30



Comments on the Stellar Structure Constants in Close Binary Systems

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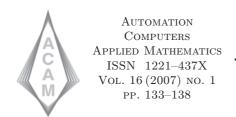
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Abstract:

The apsidal constants in close binary systems represent valuable empirical indications of the internal structure of the stars. Such constants are studied by many authors, but in different assumptions, especially, as Kopal has mentioned, only a certain weighted means \overline{k} are possible to be determined from the observed $\frac{P}{U}$ ratio. Therefore for an independent determination of the apsidal constants $(k_2)_1$ and $(k_2)_2$, the Elliptical Restricted Three-Body Problem is resumed. In addition the tidal and rotational effects are considered. The corresponding results are coupled with the classical study of apsidal motion, and a system of two equations with the two unknowns $(k_2)_1$ and $(k_2)_2$ is established. Finally, for some binary systems, the values of the apsidal constants are computed and compared with those given by Kopal.

KEY WORDS: close binary system, apsidal motion, celestial mechanics

MSC 2000: 37N05 - Dynamical systems in classical and celestial mechanics



On the Solvability of some Equations and Systems of Equations in $\ensuremath{\mathbb{C}}$

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ABSTRACT: We give some conditions on the solvability of some equations and systems

of equations in \mathbb{C} , occurring in establishing some cubature formulas on the

sphere.



Fiber Contraction Theorem in Generalized Metric Spaces

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Abstract: In this paper we extend the Fiber Contraction Principle in complete metric

spaces to Fiber Contraction Principle in complete generalized metric spaces.

KEY WORDS: Contraction principle, generalized metric space, weakly Picard operator,

fiber contraction principle.

MSC 2000: 47H10



A Generalization of Tensor Product Method

Dana Simian and Corina Simian

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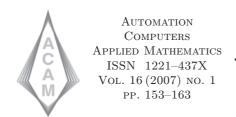
ABSTRACT: We obtain a generalization of the tensor product method, for sets of arbitrary

functionals. We give some methods for easier obtaining bivariate and three-

variate interpolation formula than using the tensor product method.

KEY WORDS: Tensor product, multivariate interpolation

RECEIVED: August 31, 2007



About a Generalization of Euler's Constant

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Abstract: The purpose of this paper is to evaluate the limit $\gamma(a,r)$ of the sequence

 $\left(\frac{1}{a_1} + \frac{1}{a_2} + \dots + \frac{1}{a_n} - \frac{1}{r} \ln \frac{a_n}{a}\right)_{n \in \mathbb{N}},$ where $(a_n)_{n \in \mathbb{N}}$ is a sequence defined by $a_n = a + (n-1)r$, for each $n \in \mathbb{N}$,

with $a, r \in (0, +\infty)$.

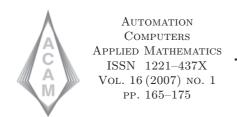
We also present the relation between $\gamma(a,r)$ and the logarithmic derivative

of the gamma function.

KEY WORDS: Sequence, convergence, Euler's constant, approximation, Gamma function.

MSC 2000: 11Y60, 40A05.

RECEIVED: February 24, 2007



Some Results for Linear Combinations of Positive Operators

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In this paper we study the techniques of linear combinations starting from Abstract:

> the studies made by H. Bohman (1952), P.L.Butzer (1953; [2]), P.P. Korovkin (1953; [11]), T. Popovici (1959; [13]), D.D. Stancu ([16]) respectively the results obtained by E. W. Cheney and A. Sharma [3], S. Eisenberg and B. Wood [18], M. Frențiu [5], A. Lupaș [9], [10], R. Martini [12]. We define the linear combinations for Favard-Szász S_n operators and we obtain different estimation of the remainder for $S_n^{[2k]}$ operator.

KEY WORDS: Linear positive operators.

MSC 2000: 41A36, 41A80



A Fixed Point Method in the Study of a Nonlinear Periodic Problem

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Abstract: In this paper we use a contractive method in the study of the nonlinear

periodic problem

 $-u''(t) + \lambda u(t) + \sin u(t) = g(t); \quad t \in (0, 1); \quad u(0) = u(1) = 0,$

where λ is a positive parameter and $g \in L^2(0,1)$.

KEY WORDS: Nonlinear periodic problem, maximal monotone operator, strongly positive

operator, Lipschitz operator, Banach fixed point theorem.

MSC 2000: 34A12, 34A34, 47J05



An Example of Applying a Theorem of Integration Term by Term of a Series of Functions and a Property of the Sequences of Real Numbers

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Abstract: Considering the nature of the series $\sum_{n=0}^{\infty} (e - E_n)$, of [8], where $E_n = 1 + 1$

 $\frac{1}{1!} + \frac{1}{2!} + \ldots + \frac{1}{n!} \to e$, M. Dicu has obtained in [1] a closed form "(4) for its n-th partial sum and, as a consequence, he has obtained that the sum of this series is also equal to e.

We present in section 2 a second method to obtain this result, using the well known Theorem 1, in relation with the integrals (7). In [1], M. Dicu has considered the sequences $(a_n)_{n=0}^{\infty}$ which has the pair of properties (i) $a_n \to a$;

(ii) $\sum_{n=0}^{\infty} (a - a_n) = a$, showing that the case of $a_n = E_n$ satisfies it. Using

Theorem 1 again, we present in section 3 a new kindred example, based on the alternate sum of E_n , denoted by \widetilde{E}_n . In section 4, in Proposition 1 we give a very simple answer to the problem of the pair of properties (i) and (ii). After this, we give two examples and we show that the example given in [1] is also a particular case of Proposition 1. In the end we offer some bibliographical comments, added just before the References.

KEY WORDS: Sequence, limit of a sequence, series, sum of a series, uniform convergence

of a sequence and a series of functions, Taylor expansion of the exponential.

MSC 2000: 26D15, 30B10, 40A05, 40A30.

RECEIVED: September 9, 2007



Some New Results in Discrete Asymptotic Analysis

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Abstract:

In a previous paper [Bull. Math. de la Soc. des Sci. Math.de Roumanie, Nouvelle Série, tome 42 (90) (1999) no.2, 159-169] we have obtained the asymptotic representation for the sum derived from the harmonic sum taking only the denominators which are in an arithmetic progression of ratio r (where r is a positive integer bigger than 1) and begin from a certain positive integer a smaller than r. The principal part of this sum is $(\ln n)/r$ [and the additive constant which appears, completely calculated, contains $\ln r$ and π (because of a complex logarithm which was involved)]. So, the difference between the sum and its principal part is a convergent sequence, with a limit equal to the above-mentioned additive constant. In the present work we study the speed of this convergence, giving a certain two-sided estimation with two positive expressions which tend both to zero and have the same order as "small infinities", more, having the limit of its ratio equal to 1.

KEY WORDS: Sequence, limit of a sequence, series, sum of a series, uniform convergence

of a sequence and a series of functions, Taylor expansion of the exponential.

MSC 2000: 26D15, 30B10, 40A05, 40A30.

RECEIVED: September 9, 2007