TRANSYLVANIAN JOURNAL OF MATHEMATICS AND MECHANICS

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Volume 15 (2023), Number 1-2

On a Reduction Method Using Max-Plus Algebra for a Initial Value Problem in Classic Algebra and the Solution of the Problem

Author(s): ZELIHA AYDOĞMUŞ and AHMET İPEK

Abstract: In this paper, we first will develop a reduction method in max-plus algebra for the initial value problem given by

$$\begin{cases} x\left(t+n\right) = \max\left\{a_{n-1}\left(t\right) + x\left(t+n-1\right), \ldots, a_1\left(t\right) + x\left(t+1\right), a_0\left(t\right) + x\left(t\right), f\left(t\right)\right\} \\ x\left(t_0\right) = c_1, \ x\left(t_0+1\right) = c_2, \ldots, x\left(t_0+n-1\right) = c_n \end{cases}$$

and then we obtain the solutions to the this equation.

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A New Type Random Iteration Scheme for Random Common Fixed Point of Three Operators

Author(s): MUHAMMED EMIN BATUHAN and ISA YILDIRIM
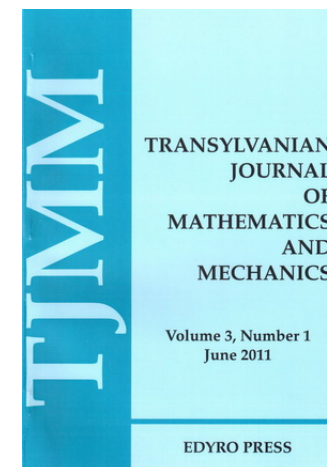
Abstract: In this paper, we introduce a random iteration scheme for three asymptotically nonexpansive random operators defined on a uniformly convex separable Banach space and prove its convergence to a common fixed point of three random operators.

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Reduced-Order Modelling Based on Koopman Operator Theory

Author(s): DIANA A. BISTRIAN, GABRIEL DIMITRIU and IONEL M. NAVON

Abstract: The present study focuses on a subject of significant interest in fluid dynamics: the identification of a model with decreased computational complexity from numerical code output using Koopman operator theory. A reduced-order modelling method that incorporates a novel strategy for identifying the most impactful Koopman modes was used to numerically approximate the Koopman composition operator.

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Singularities, Torsion, Cauchy Integrals and Their Spectra on Space-Time

Author(s): DR. FRANCISCO BULNES

Abstract: All field sources are identified as fields φAB , which can be identified too as poles or singularities in the complex Riemannian manifold model of the space-time including field sources, such that their integrals can calculate their value through the Cauchy type integrals as the Conway integrals to any loop generated in the local causal structure of the space-time around of these fields. The integrals are solutions of the spinor equation associated to the corresponding twistor field equation. A theorem is mentioned on the evidence of field torsion as field invariant and geometrical invariant in poles of Cauchy type integrals in spinor-twistor frame. Then an immediate result is that torsion existence in the space-time induces gravitational waves in a projective bundle. Sources are evidence at least locally of torsion existence. Then exists curvature here. Some conjectures and technical lemmas are mentioned as references of other works and is included a new application conjecture too.

Analytic Parametrization of the Algebraic Points of Given Degree on the Curve of Affine Equation $y^2 = 157 \left(x^2 - 2\right)\left(x^2 + x\right)\left(x^2 + 1\right)$

Author(s): MOHAMADOU MOR DIOGOU DIALLO

Abstract: We give an explicit parametrization of the set of algebraic points of given degree on $\mathbb{Q}$ over the affine equation curve: $y^2 = 157 \left(x^2 - 2\right)\left(x^2 + x\right)\left(x^2 + 1\right)$. This note treat aspecial case of the curves described by Anna ARNTH-JENSEN and Victor FLYNN in [1], where the generators of the Mordell-Weil group explained.

Some Ostrowski Type Inequalities for Two Sin-Integral Transforms of Absolutely Continuous Functions

Author(s): SILVESTRU SEVER DRAGOMIR AND GABRIELE SORRENTINO

Abstract: For a Lebesgue integrable function $f : [a, b] \subset [-\pi/4, \pi/4] \to \mathbb{C}$ we consider the sin-integral transforms

$$S_f\left(x\right) := \int_a^b f\left(t\right) \sin\left(x - t\right) dt,\ x \in [a, b]$$

and

$$\widetilde{S}_f\left(x\right) := \int_a^x f\left(t\right) \sin\left(t - a\right) dt + \int_x^b f\left(t\right) \sin\left(b - t\right) dt,\ x \in [a, b]$$

We provide in this paper some upper bounds for the quantities

$$\left| f\left(b\right)\cos\left(b-x\right) - f\left(a\right)\cos\left(x-a\right) - S_f\left(x\right) \right|$$

and

$$\left| \widetilde{S}_f\left(x\right) - \left[f\left(a\right) + f\left(b\right) - 2\cos\left(\frac{b-a}{2}\right)\cos\left(x - \frac{a+b}{2}\right) f\left(x\right) \right] \right|$$

for $x \in [a,b]$, in terms of the p-norms of the derivative f' for absolutely continuous functions $f : [a,b] \subset [-\pi/4, \pi/4] \to \mathbb{C}$.

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Trigonometrically tgs-Convexity

Author(s): HURIYE KADAKAL and MAHIR KADAKAL

Abstract: In this manuscript, we introduce and study the concept of trigonometrically tgs-convex function and prove two Hermite-Hadamard type integral inequalities for the newly introduced class of functions. Also, some applications to special means of real numbers are also given.

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Generalized Fresnel Integrals and the Dirac Representative Sequences Generated by Them

Author(s): WILHELM W. KECS

Abstract: The Fresnel cosine and sine integrals are generalized in the Euclidean space $\mathbb{R}^n$, $n \geq 2$. Two families of functions are associated with them and it is shown that they converge in the sense of distributions towards Dirac's distribution. The properties of these Dirac representative sequences are established, and the obtained results are exemplified in cases $n = 1,2,3$.

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Generalized Biconvex Functions and Directional Bivariational Inequalities

Author(s): MUHAMMAD ASLAM NOOR and KHALIDA INAYAT NOOR

Abstract: Some new classes of generalized biconvex sets and biconvex functions with respect to an arbitrary function k and the bifunction $\beta\left(.-.\right)$ are introduced and studied. These new biconvex functions are nonconvex functions and include the convex functions and k-convex as special cases. We study some basic properties of generalized biconvex functions. It is shown that the minimum of generalized biconvex functions on the generalized biconvex sets can be characterized by a class of variational inequalities, which is called the directional bivariational inequalities. Using the auxiliary technique, several new inertial type methods for solving the bivariational inequalities are proposed and analyzed. Convergence analysis of the proposed methods is considered under suitable pseudomonotonicity, which are weaker conditions than monotonicity. Some open problems are also suggested for future research.

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On the Solution of a Linear Matrix Difference Equation

Author(s): AHMET ÖZDAĞ and AHMET İPEK

Abstract: In this paper we present the closed-form expression for the solution of the linear matrix difference equation

$$X_{n+1} = AX_n + X_nB, \;\; X\left(0\right) = C, \;\; n = 0,1,2,\ldots$$

which we obtained with the aid of the Kronecker sum, Kronecker product and Vec operator.

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Application of the Least Squares Method to Study the Correlation Between Climatic Factors in Romania

Author(s): ANAMARIA POPESCU

Abstract: The paper presents linear and non-linear regression mathematical models that estimate the evolution of processes or phenomena based on some parameters that define the processes and phenomena in order to perform calculations and approximations of experimental data. Having a series of data on climatic factors, the analysis of the results from a period from 1901 to the present, consisting of decades, is presented, approaching the approximation by the least squares method and verifying the existence of a correlation and identifying the model.

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