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CONTENTS

Abstract: A theoretical analysis has been carried out to study the Ray-leigh- Bénard convection in a couple stress fluid in which the system is rotating about its own axis with non-uniform rotation speed. The non-classical Maxwell-Cattaneo heat flux has been used in place of the classical Fourier heat flux law. A linear stability analysis is performed and the effect of various governing parameters on the system is studied. It is found that the low-frequency rotation modulation can have a significant effect on the stability of the system.

Abstract: In this article, modified variational iteration technique is successfully applied to find the approximate solution of Caputo fractional mixed Volterra-Fredholm integro-differential equation. The reliability of the method and reduction in the size of the computational work give this method a wider applicability. Also, the behavior of the solution can be formally determined by analytical approximation. Moreover, we proved the existence and uniqueness results. Finally, an example is included to demonstrate the validity and applicability of the proposed technique.

Mradul Veer Singh, M. L. Mittal and B. E. Rhoades

Abstract: In this paper we compute the degree of approximation of functions in Lip α and $W(L_p, \xi(t))$ $(p \geq 1)$ classes and their conjugates using a $(C^1 \cdot T)$-summability matrix. Here C^1 denotes well known Cesàro matrix of order 1 and T is an infinite lower triangular regular matrix. The popular summability methods such as Euler (E_q), Nörlund (N_p) and Riesz (R_p) methods are particular cases of matrix (T)-method, so our results also hold for various product methods such as $(C^1 \cdot E_q)$, $(C^1 \cdot N_p)$, $(C^1 \cdot R_p)$ etc. Further we compare our results with the earlier known results of Lal (2009), Singh et al. (2012) and Mishra et al. (2014), where they have used the $(C^1 \cdot N_p)$-matrix to obtain the degree of approximation of functions in the above classes. We also deduce some corollaries for functions in various Lipschitz classes.

M. Kammuji, Z. K. Eshkuvatov and Z. Muminov

Abstract: Approximate solution of linear Integro-Differential equations (IDEs) of order one is presented based on the truncated series of Legendre polynomials. Reduction technique is applied to transform the IDEs into integral equations (IEs). Gauss Legendre quadrature formula is implemented to the kernel integrals and collocation method is used to form a system of linear algebraic equations. The collocation points are chosen as the roots of Legendre polynomials. The existence and uniqueness of the solution are shown. Rate of convergence of the proposed method is proved. The accuracy and effectiveness of the proposed method are shown by numerical examples with comparisons. Numerical results reveal that proposed method is dominated over repeated trapezoidal rule, differential transform method and Lagrange polynomial approximation.

Renukadevi S. Dyavanal and Rajalaxmi V. Desai

Abstract: In this paper, we investigate the uniqueness of meromorphic functions concerning a polynomial together with difference operator sharing the value 1 with weight l, extend and generalize the results of Liu, et al. [16] and Wu [18].

Sourav Kanti Patra and Sukrit Chakraborty

Abstract: The concept of image partition regularity near zero was first investigated by De and Hindman. In contrast to the finite case, infinite image partition regular matrices near zero are very fascinating to analyze. In this regard the abstraction of centrally image partition regular matrices near zero was introduced by Biswas, De and Paul. In this paper we propose the notion of matrices that are C-image partition regular near zero for dense subsemigropus of $((0, \infty), +)$.

Abstract: A very general positive sublinear Choquet integral type operator is given through a convolution-like iteration of another general positive sublinear operator with a scaling type function. Sufficient conditions are given for shift invariance, preservation of global smoothness, convergence to the unit with rates. Furthermore, two examples of very general specialized operators are presented fulfilling all the above properties, the higher order of approximation of these operators is also studied.

Abstract: In this paper, we study the question of existence of positive solutions for a class of nonlinear boundary value problem for fractional differential equations involving Caputo fractional derivative of order α, $(2 < \alpha < 3)$ with an advanced argument under integral boundary conditions. Our analysis relies on known Guo-Krasnoselskii fixed point theorem and we obtain uniqueness of positive solutions by using Banach fixed point theorem. We support our result with suitable example.

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