

CONTENTS

- Tala S. Alaa Eddine and Mohammad N. Abdulrahim**
ON THE IRREDUCIBILITY OF WADA'S REPRESENTATION OF THE PURE
BRAID GROUP ON N STRINGS 149-178

Abstract: We consider the reduced Wada's representation of the pure braid group $\varphi_n : P_n \rightarrow GL_{n-1}(\mathbb{C})$. Then we determine necessary and sufficient conditions under which the reduced representation φ_n is irreducible.

- Gunasekaran Nallaselli, Arul Joseph Gnanaprakasam and Hasanen A. Hammad**
NOVEL RESULTS OF FIXED POINT THEOREMS FOR ORTHOGONAL
GENERALIZED CONTRACTION MAPPINGS WITH APPLICATIONS 179-200

Abstract: The purpose of this publication is to derive some fixed point results for generalized orthogonal (ϕ, ψ) -weak contraction mappings in the situation of orthogonal Branciari metric space. In addition, auxiliary functions are provided to help us prove our findings. Furthermore, some of the ramifications of the fundamental theorems are stated as corollaries. Finally, the theoretical conclusion is used to solve a differential equation, which reinforces and supports the results provided.

- Bal Bahadur Tamang, Ajaya Singh and Manoj Gyawali**
FOR DIFFERENT PRIME NUMBERS D AND AN ODD INTEGER N IN THE
QUADRATIC DIOPHANTINE EQUATION $X^2 - DY^2 = N$ 201-228

Abstract: In this paper, we study the integral solutions to the quadratic Diophantine equation of the form $X^2 - DY^2 = N$, where D is a prime number, especially $D = 13, 17, 19$, and N is an odd integer. We describe the concepts of quadratic residues and use algebraic methods to determine the solvability or unsolvability of quadratic Diophantine equations. Moreover, we derive significant results on the solvability or unsolvability of modified quadratic Diophantine equations with varying values of D and N , using various mathematical tools such as the Euclidean algorithm, Thue's Theorem, and the Chinese Remainder Theorem. Our results enhance the understanding of the relationship between prime numbers, odd integers, and the structure of solutions to the quadratic Diophantine equation.

- Assia Frioui, Badreddine Meftah and Abdelghani Lakhdari**
NEW INTEGRAL INEQUALITIES FOR r -CONVEX FUNCTIONS 229-255

Abstract: To tackle the challenges posed by natural problems, integral calculation becomes imperative. When direct integration falls short, approximating the integral becomes necessary, employing quadrature formulas like Newton-Cotes or Gauss methods. This study delves into

various approximations for the left side of the generalized Gauss-Jacobi quadrature formula, drawing insights from prior research and existing literature. The results obtained rely on a specific identity and on the notion of r -convexity. Multiple techniques are employed to break down integrals, including the use of Holder and Minkowski inequalities, as well as linearization methods like the Young and Bernoulli inequalities.

Inzamam ul Huque and Abdelkarim Boua

STUDY OF NEAR-RINGS WITH GENERALIZED MULTIPLICATIVE
DERIVATIONS

257-275

Abstract: In this paper, we study the commutativity of 3-prime near-rings which satisfy some identities involving multiplicative generalized derivations. We also prove some theorems which give a structure of these mappings.

Shyam Lal and Upasana Vats

MULTI-RESOLUTION ANALYSIS AND MODULI OF CONTINUITY OF SOLUTIONS
FOR NONLINEAR LIENARD EQUATIONS BY VIETA-LUCAS WAVELET

277-302

Abstract: In this paper, a new algorithm based on Vieta-Lucas wavelet series is introduced to solve nonlinear Lienard equations. The Vieta-Lucas wavelets are derived by dilation and translation of an orthogonal Vieta-Lucas polynomial. The orthonormality of this novel wavelet is verified. The convergence analysis of solution function f (of Van der Pol and Duffing Oscillator) belonging to Holder's class has been discussed. Four Vieta-Lucas wavelet approximations $E_{2^k,0}^{(1)}, E_{2^k,M}^{(2)}, E_{2^k,M}^{(3)}, E_{2^k,M}^{(4)}$ and moduli of continuity $W^{(1)}(f - S_{2^k,0}(f), \frac{1}{2^k}), W^{(2)}(f - S_{2^k,M}(f), \frac{1}{2^k}), W^{(3)}(f - S_{2^k,M}(f), \frac{1}{2^k}), W^{(4)}(f - S_{2^k,M}(f), \frac{1}{2^k})$ of solution functions belonging to $H_\omega^\alpha [0, 1)$ by $(2^k, M)^{th}$ partials sums have been estimated. The Multiresolution analysis of this wavelet has been investigated. In this instance, it has been discovered that the approximations completely match with their exact solutions. The error between Vieta-Lucas wavelet solution and exact solution is less than the error between exact solution and solution obtained by ODE-45. This validates and demonstrates the precision of the solution of Van der Pol and Duffing Oscillators by Vieta-Lucas wavelet method. In the world of approximations and wavelet theory, this is a remarkable accomplishment.

Abhijit Banerjee and Jhuma Sarkar

A NOTE ON EXISTENCE OF ENTIRE SOLUTIONS OF NON-LINEAR
DIFFERENTIAL-DIFFERENCE EQUATIONS

303-315

Abstract: This article is devoted to investigate the solvability of non-linear differential-difference equations with respect to transcendental entire solution of both finite and infinite order of certain types of non-linear differential-difference equations. We have provided a series of examples to illustrate our findings. The results obtained in the paper improve and extend some earlier ones.
