Bulletin of the Allahabad Mathematical Society

Volume 35, Part 1, 2020

CONTENTS

Abstract: Our aim is to establish some generalized fractional Hermite-Hadamard inequalities by utilizing the functions whose second derivatives are bounded. Given results in this paper involve a large class of functions. We also give some new inequalities for k-Riemann-Liouville fractional integrals as special cases of our main results.

Abstract: Based on Hölder continuous first derivative, we study the local convergence analysis of fifth and sixth order convergent Chebyshev-Halley type family of methods for obtaining a locally unique solution of a nonlinear equation. This convergence analysis generalizes the local convergence under Lipschitz continuity condition and helps in solving those equations for which Lipschitz continuity condition fails. The existence and uniqueness of the solution are shown with the error bounds. In the numerical experiments, our analytical results are found to be productive and produce better results.

Abstract: This article introduces planar ribbons, Vergili ribbon complexes and ribbon nerves in Alexandroff-Hopf-Whitehead CW (Closure finite Weak) topological spaces. A *planar ribbon* (briefly, ribbon) in a CW space is the closure of a pair of nesting, non-concentric filled cycles that includes boundary but does not include the interior of the inner cycle. Each planar ribbon has its own distinctive shape determined by its outer and inner boundaries and the interior within its boundaries. A *Vergili ribbon complex* (briefly, *ribbon complex*) in a CW space is a non-void collection of countable planar ribbons. A *ribbon nerve* is a nonvoid collection of planar ribbons (members of a ribbon complex) that have nonempty intersection. A planar CW space is a non-void collection of cells (vertexes, edges and filled triangles) that may or may not be attached to each other and which satisfy Alexandroff-Hopf-Whitehead containment and intersection conditions. In the context of CW spaces, planar ribbons, ribbon complexes, ribbon nerves and vortex nerves are characterized by Betti numbers derived from standard Betti numbers $\mathcal{B}_0$ (cell count), $\mathcal{B}_1$ (cycle count) and $\mathcal{B}_2$ (hole count), namely, $\mathcal{B}_{rb}$ and $\mathcal{B}_{rbNrv}$ introduced in this paper. Results are given for collections of ribbons and ribbon nerves in planar CW spaces equipped with an approximate descriptive proximity, division of the plane into three bounded regions by a ribbon and Brouwer fixed points on ribbons. In addition, the homotopy type of ribbon nerves are introduced.

Abstract: Here we consider and study very general stochastic positive linear opertors induced by general positive linear operators that are acting on continuous functions. These are acting on the space of real conformable fractionally differentiable stochastic processes. Under some very mild, general and natural assumptions on the stochastic processes we produce related conformable fractional stochastic Shisha-Mond type inequalities of L^q-type $1 \leq q < \infty$ and corresponding conformable fractional stochastic Korovkin type theorems. These are regarding the stochastic q-mean conformable fractional convergence of a sequence of stochastic positive linear operators to the stochastic unit operator for various cases. All convergences are produced with rates and are given via the conformable fractional stochastic inequalities involving the stochastic modulus of continuity of the α-th conformable fractional derivatives of the engaged stochastic process, $\alpha > 0$, $\alpha \notin \mathbb{N}$. The impressive fact is that the basic real Korovkin test functions assumptions are enough for the conclusions of our conformable fractional stochastic Korovkin theory. We give conformable fractional applications to stochastic Bernstein operators.

Abstract: We obtain some new cyclical inequalities in inner product spaces, by using elementary numerical inequalities, and give their counterparts in Aitchison's geometry.

****