

## Development of a Model Based on Wavelets and Matrices for the Treatment of Weakly Singular Partial Integro-Differential Equations

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**Abstract :** We present a new model based on viscoelasticity for the Non-Newtonian fluids. We use a matrix formulated algorithm to approximate solutions of a class of partial integro-differential equations with the given initial and boundary conditions. Some numerical results are presented to simplify application of operational matrix formulation and reduce the computational cost. Convergence analysis, error estimation and numerical stability of the method are also investigated. Finally, some test examples are given to demonstrate accuracy and efficiency of the proposed method.

**Keywords :** Legendre Wavelets, operational matrices, partial integro-differential equation, viscoelasticity

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