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Angular Motion and Nonlinear Conservation Laws: A Study on the Flow of Erying-Powel Hybrid Nanofluid over a Riga Plate

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This study explores the effects of rotation in a fluid flow over a magnetized surface, which has practical applications in the design and operation of induction motors, electric generators, and induction regulators. The mathematical model provides a framework for analysing and predicting the complex interaction between a Erying-Powel fluid, hybrid nanoparticles, rotation, non-linear heat and mass conservation laws. To simplify the dynamical mathematical model into a solvable system of dimensionless ordinary differential equations, a scaling transformation of the similarity form is employed. Due to the complexity of the coupled differential equations, an assume solution using the Lagrange polynomial as the basis function is employed through the use of collocation method. This approach allows us to construct a differentiation matrices, which are essential for solving the differential equations. A parametric analysis of all the pertinent parameters, such as the Eckman number and volume fraction, is accounted for through tabular and graphical illustrations.

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