

**NUMERICAL STUDY OF THERMODIFFUSION EFFECTS ON BOUNDARY LAYER FLOW OF NANOFUIDS OVER A POWER LAW STRETCHING SHEET WITH SLIP CONDITIONS AND MAGNETIC FIELDS**

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In the study, boundary layer flow over a moving flat plate with velocity slip and applied magnetic field is analyzed. The governing partial differential equations are converted into a nonlinear ordinary differential equation through an appropriate similarity transformation. Recently, Liao invented a Directly Defining Inverse Mapping Method (MDDiM) for nonlinear differential equations. Further, it is guaranteed that this novel method can be used to obtain convergent series solutions for boundary layer flow problems when the inverse linear mapping satisfies the properties of linearity, injectivity and finiteness. In this present work, the effect of the magnetic field and the second-order slip on the boundary layer flow is investigated using the MDDiM and found in excellent agreement with the numerical results obtained by the Runge–Kutta method for some special cases. The novelty of this study is this is the first time that someone has studied the effect of second-order slip on boundary layer flow of nanofluids over a *power law* stretching under the presence of the magnetic field, but for *linear* and *quadratic* stretching. Further, this is the first time MDDiM has been used to solve a system of four nonlinear coupled systems, but for systems of three equations. Also, the results obtained with minimum errors are presented graphically and discussed.

**Keywords:** Boundary-layer, Directly Defining Inverse Mapping, Second-order slip, Stretching surface