

Thermal Stability Analysis of Reactive Hydromagnetic Third-Grade Fluid through a Channel with Convective Cooling

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Abstract: This paper investigates the hydromagnetic flow of a reactive third grade fluid between two parallel plates with convective boundary conditions. Approximate solution of the strongly nonlinear boundary value problem is obtained using modified Adomian decomposition method (mADM). The rapidly convergent series solution is combined with the diagonal Pade approximants to determine the singularity inherent in the solution. Parametric study of the fluid flow are conducted and discussed including bifurcation conditions.

Keywords: Reactive fluids, Third grade fluid, Convective cooling, mADM, Pade approximant, Arrhenius kinetics