

Effect of Slip Condition and Magnetic Field on Unsteady MHD Thin Film Flow of a Third Grade Fluid with Heat Transfer down an Inclined Plane

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Abstract : The analysis has been carried out to study unsteady MHD thin film flow of a third grade fluid down an inclined plane with heat transfer when the slippage between the surface of plane and the lower surface of the fluid is valid. The governing nonlinear partial differential equations involved are reduced to linear partial differential equations using regular perturbation method. The resulting equations were solved analytically using method of separation of variable and eigenfunctions expansion. The solutions obtained were examined and discussed graphically. It is interesting to find that the variation of the velocity and temperature profile with the slip and magnetic field parameter depends on time.

Keywords : non-Newtonian fluid, MHD flow, thin film flow, third grade fluid, slip boundary condition, heat transfer, separation of variable, eigenfunction expansion

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