

Effect of Magnetic Field on Unsteady MHD Poiseuille Flow of a Third Grade Fluid Under Exponential Decaying Pressure Gradient with Ohmic Heating

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Abstract : The unsteady MHD Poiseuille flow of a third grade fluid between two parallel horizontal nonconducting porous plates is studied with heat transfer. The two plates are fixed but maintained at different constant temperature with the Joule and viscous dissipation taken into consideration. The fluid motion is produced by a sudden uniform exponential decaying pressure gradient and external uniform magnetic field that is perpendicular to the plates. The momentum and energy equations governing the flow are solved numerically using Maple program. The effects of magnetic field and third grade fluid parameters on velocity and temperature profile are examined through several graphs.

Keywords : exponential decaying pressure gradient, MHD flow, Poiseuille flow, third grade fluid

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