Thin Film Flow of a Third Grade Fluid with Variable Viscosity

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Z. Naturforsch. 64a, 553 – 558 (2009); received Mai 13, 2008 / revised November 25, 2008

The effects of variable viscosity on the flow and heat transfer in a thin film flow for a third grade fluid has been discussed. The thin film is considered on the outer side of an infinitely long vertical cylinder. The governing nonlinear differential equations of momentum and energy are solved analytically by using homotopy analysis method. The expression for the viscous dissipation and entropy generation are also defined. The graphical results are presented for various physical parameters appearing in the problem.

Key words: Third Grade Fluid; Variable Viscosity; Thin Film Flow; Constant Pressure Gradient.