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HOMOTOPY ANALYSIS TO FLOW AND HEAT TRANSFER OF A VISCO-ELASTIC FLUID FOR LARGE PRANDTL NUMBERS OVER A STRETCHING SHEET

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Abstract

In this paper we study the characteristics of a boundary layer flow and heat transfer of a viscoelastic fluid over a stretching sheet under various physical parameters by taking large Prandtl numbers. The governing equations are converted into the ordinary differential equations using suitable similarity variables and solved using an analytical technique known as homotopy analysis method (HAM). The effects of various physical parameters such as viscoelastic parameter k_1, Pandtl number Pr, Eckert number Ec and heat source/sink parameter β on fluid flow and heat transfer are depicted graphically and in tabular forms. Comparison of the present analysis is also made with the existing results in the literature and are seen in good agreement.

Key Words : *Visco-elastic fluid, Boundary layer flow, Stretching sheet, Heat generation/absorption, Homotopy analysis method.*