

Finite Difference Solution of the Unsteady Flow of a Third Grade Fluid Over an Infinite Flat Plate

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Abstract: Several Authors have studied the steady flow of third grade fluid past through a porous plate and obtained the solution using power series expansion and homology method. In this paper we have studied the flow of third grade fluid over an infinite flat plate which is set to motion with a time dependent velocity $u(t)$ using an unconditionally stable finite difference method. As a result it is not necessary to restrict the parameters. The equations governing the flow are solved using damped Newton method. The effect of different flow parameters on the velocity field are discussed and reflected in the figures. The major advantage of this method lies in non-restriction of flow parameters. The results are compared with the results obtained by Rajgopal and Endogan (1995) analytically and this method gives more accurate solution.

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