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UNSTEADY FLOW OF TWO IMMISCIBLE VISCOELASTIC FLUIDS OF HIGHER ORDER IN A POROUS MEDIA WITH TRANSIENT PRESSURE GRADIENT

SOUMEN BANERJEE

Saroj Mohan Institute of Technology,
Hooghly-712512, (W.B) India

Abstract

The flow of two immiscible visco-elastic fluids of higher order bounded by a rectilinear pipe of uniform cross section in a porous media under transient pressure gradient is studied in this paper. Towards solving the problem variable separation technique has been applied. The analytical solution of the problem has been utilised to find out the solution of the corresponding problems in the cases of visco-elastic fluids: (i) Maxwell fluids of first and second order, (ii) Oldroyd fluids of first and second order, (iii) Rivlin- Ericksen fluids of first and second order, (iv) Walters fluids and finally in case of ordinary viscous fluids also. Numerical computation of the velocity profiles of Maxwell , Oldroyd, Rivlin-Ericksen and ordinary viscous fluids have also been derived in the investigation. Clearly, these analytical solutions are very useful and it will create a new horizon in the field of fluid dynamics.

Key Words and Phrases : *Unsteady flow, Porous media, Visco-Elastic fluids.*