

Upper Convected Maxwell Flow Due to a Solid Rod Oscillating with Different Frequencies

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Abstract: The motion of a viscoelastic, incompressible flow of an upper-convected Maxwell fluid, due to the motion of a long, straight, solid, circular cylinder, oscillating both longitudinally and torsionally with different frequencies is examined. The flow is considered to be fully established and so start up effects are ignored. Analytical expressions for the velocity field, the tangential drag and the work done by the drag force have been obtained and the corresponding Newtonian cases deduced. The velocity components and work done are displayed graphically using particular values of the flow parameters. These are compared with Newtonian fluids so as to get some insight into the effects of elasticity.

Key words: Oscillation, upper convected Maxwell, viscoelastic, longitudinal, torsional, different frequencies, Newtonian
