

On the energetic balance for the flow of an Oldroyd-B fluid induced by a constantly accelerating plate

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Abstract

Exact and approximative expressions are established for dissipation, the power of the shear stress at the wall and the boundary layer thickness corresponding to the motion of an Oldroyd-B fluid induced by a constantly accelerating plate. The similar expressions for Maxwell, Newtonian and second grade fluids, performing the same motion, are obtained as limiting cases of our general results. The specific features of the four models are emphasized by means of the asymptotic approximations.

Keywords: Oldroyd-B fluid; Kinetic energy; Dissipation; Power of the shear stress at the wall; Boundary layer thickness.

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