1063-76-29 **Ahmed Ahmed kaffel*** (kaffel07@gmail.com), 1404 J university city blvd, Blacksburg, VA 24060, and **Michael Renardy**. *Linear instability of plane parallel viscoelastic shear flows in the limit of infinite Weissenberg and Reynolds numbers.*

Elastic effects on the hydrodynamic instability of inviscid parallel shear flows are investigated through a linear stability analysis. We focus on the upper convected Maxwell model in the limit of infinite Weissenberg and Reynolds numbers. Specifically, we study the effects of elasticity on the instability of a few classes of simple parallel flows, specifically plane Poiseuille and Couette flows, the hyperbolic-tangent shear layer and the Bickley jet. The equation for stability is derived and solved numerically using the spectral Chebyshev collocation method. This algorithm is computationally efficient and accurate in reproducing the eigenvalues. We consider flows bounded by walls as well as flows bounded by free surfaces. In the inviscid, nonelastic case all the flows we study are unstable for free surfaces. In the case of wall bounded flow, there are instabilities in the shear layer and Bickley jet flows. In all cases, the effect of elasticity is to reduce and ultimately suppress the inviscid instability. (Received July 08, 2010)