

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Newtonian drop deformation in a viscoelastic matrix under shear¹

SHAHRIAR AFKHAMI, PENGTAO YUE, YURIKO RENARDY, Virginia Tech —
When a Newtonian drop is sheared in a viscoelastic matrix, the direct numerical simulation produces a viscoelastic “wake” at the interface at the front and back of the drop. In the case of a drop reaching a stationary state, the stresses in the wake and the viscous shear balance out the interfacial tension force. When a viscoelastic drop is sheared in a Newtonian matrix, numerical simulations exhibit an overshoot in the transient evolution of drop deformation. Experimental observations also show that an overshoot can occur when a Newtonian drop is sheared in a viscoelastic matrix. However, these overshoots do not appear for 3D drop computations. In this work, we investigate why drop simulations in 3D do not display overshoots.

¹NSF-DMS-0456086, NCSA TG-CTS060013N

Shahriar Afkhami
Virginia Tech

Date submitted: 18 Nov 2008

Electronic form version 1.4