

Discontinuities In Rheology

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This presentation will outline recent research which has been carried out in the field of polymer rheology. A large number of unexpected phenomena have been observed which are important in many fields of science and technology. We shall look specifically at phenomena dealing with

- yield stress measurements in multiphase systems. In particular, we shall discuss our new slotted plate technique to determine yield stress values as low as 10^{-4} Pa without extrapolation. That is: we achieve an improvement of several orders of magnitude over the vane technique, making our plate technique suitable for yield stress determinations of colloidal and nano suspensions.
- bubble dynamics in viscoelastic media. Here we shall discuss our recent contribution towards the solution of the velocity jump discontinuity observed occasionally (since the late sixties) when plotting bubble velocity versus bubble volume. Gas-liquid systems are ubiquitous in practice and understanding bubble behavior in complex fluids is important.
- stress jump. We will discuss modified network model predictions of the instantaneous gain or loss of stress on startup or cessation of flow.