Abstract Submitted
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Saffman-Taylor Instability for a non-Newtonian fluid[1] PRABIR DARIPA, Texas A&M University — Motivated by applications, we study classical Saffman-Taylor instability involving displacement of an Oldroyd-B fluid displaced by air in a Hele-Shaw cell. The lubrication approximation is used by neglecting the vertical component of the velocity. We obtain an explicit expression of one of the components of the extra-stress perturbations tensor in terms of the horizontal velocity perturbations. The main result is an explicit formula for the growth constant (in time) of perturbations, given by a ratio in which a term depending on the relaxation and retardation (time) constants appears in the denominator of the ratio. This exact result compares extremely well with known numerical results. It is found that flow is more unstable than the corresponding Newtonian case. This is a joint work with Gelu Pasa.

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