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Singularities and surprises in porous media models of interfacial non-Newtonian flows

Monday, 22 May 2023 15:00 (15 minutes)

We consider the Hele-Shaw model of porous media flows involving two immiscible upper convected Maxwell fluids [1, 2]. Linear stability analysis shows that singularities up to three types can occur including resonance and fracture, the latter one consistent with the experimental results of Mora and Manna [3]. The resonance occurs when one of these two fluids is air and is removed when air is replaced by a Newtonian fluid. The Oldroyd-B case currently in progress will also be discussed. This is joint work with Zhiying Hai.

Participation

In-Person

References

1. Zhiying Hai and Prabir Daripa, Linear instability of interfacial Hele-Shaw flows of viscoelastic fluids, Journal of Non-Newtonian Fluid Mechanics,Vol. 309 (2022) 104923

2. Zhiying Hai and Prabir Daripa, Linear instability of viscoelastic interfacial Hele-Shaw flows: a Newtonian fluid displacing an UCM fluid, Journal of Non-Newtonian Fluid Mechanics,Vol. 303 (2022) 104773

3. S. Mora, and M. Manna, From viscous fingering to elastic instabilities, J. Non-Newtonian Fluid Mech. 173-174 (2012) 30-39.

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Energy Transition Focused Abstracts

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