Abstract Submitted
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Optimal perturbations for linear stability of two fluid columns of different densities subject to gravity[1] ADITYA PRATHAMA, CARLOS PANTANO, University of Southern California — We study the linear stability of a vertical interface separating two fluid columns of different densities under the influence of gravity. Initially, we assume quasi-steady state (QSSA) of the base flow and pose the problem as an eigenvalue problem. Subsequently, we carry out adjoint-based optimization of the most amplified eigenmode. This results in an initial condition that leads to the maximum growth of disturbances at a finite time. Preliminary results indicate that the perturbation energy of wave modes with small wave numbers may experience substantial transient growth prior to decaying asymptotically in time, despite infinitesimal assumption of the linearized problem. It is also found that the maximum growth rate is about one order of magnitude higher than that of the non-optimized case. The sensitivity of perturbation growth with respect to initial time, density, and viscosity ratios will be investigated.

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