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A linear spatial stability analysis of liquid-gas rotating co-flowing jet YAOHONG WANG, MARK SUSSMAN, M.Y. HUSSAINI, Department of Mathematics, Florida State University — We present a linear spatial stability analysis of a liquid-gas rotating co-flowing jet. The parallel mean velocity is computed as a function of the radial coordinate by solving the coupled liquid-gas Navier-Stokes equations in a cylindrical coordinate system. A multi-domain Chebyshev spectral collocation method is applied to the perturbed Navier-Stokes equations (linearized about the mean parallel flow). Both axisymmetric and helical modes are considered. Numerical calculations are performed to obtain the growth rates and frequencies of the most unstable modes. The effect of density ratio, viscosity ratio and surface tension are discussed.

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