Effect of sinusoidal perturbation of the inner cylinder on the stability criteria in a wide gap Taylor-Couette flow KRISHNASHIS CHATTERJEE, ANNE STAPLES, Virginia Polytechnic Institute and State University — The effects of sinusoidal perturbations of the inner cylinder radius in the axial direction in a Taylor-Couette flow apparatus are studied. The base flow solution in the apparatus is derived and then linear stability analysis is performed using the wide gap approximation. The stability criteria are established based on the critical Taylor numbers which mark the transition from the purely circular base flow to the Taylor Vortex flow regime. The effects of varying the forcing wavelength and modulation amplitude on the stability criteria are investigated. The studies are conducted for different instability wave numbers and inner and outer cylinder rotational velocity combinations. The results are compared with those obtained in the same apparatus using a narrow gap assumption, and with the classical Taylor-Couette case.

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