Linear stability analysis of granular Taylor-Couette flow

MEHEBOOB ALAM, Jawaharlal Nehru Centre, Bangalore — The linear stability analysis of the circular Couette flow of granular materials is carried out in the rapid shear regime. The kinetic-theory based continuum models, with a separate balance equation for granular/fluctuation energy, is employed, and the underlying rheological model is likely to be valid for a range of density from the dilute to dense regime. The steady base state equations for the case of rotating inner cylinder and stationary outer cylinder are solved numerically; it is found that the inelastic dissipation can make the flow radially inhomogeneous even in the narrow-gap limit. The linear stability equations are solved using spectral collocation method. The onset of Taylor-like vortices and the effects of inelastic dissipation and compressibility on them are analysed.