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Stability analysis of Couette flows of dry granular materials CHRISTOS VARSAKELIS, MILTIADIS PAPALEXANDRIS, Univ Catholique de Louvain — In this talk, we investigate the stability of a unidirectional Couette flow of a dry granular material, as predicted by a continuum flow model, via a linear stability analysis. A classical normal-mode analysis is employed which results in a fourth-order polynomial eigenvalue equation for the modes of disturbance. The eigenvalue problem is solved numerically via a Chebyshev polynomial method and extensive parametric studies are performed. The results of this study suggest that the flow of interest is linearly unstable for all values of Froude, Reynolds and Galilei numbers of practical interest. Additionally, we discuss the relation between the magnitude of the predicted growth rates and the observability of this instability, as well as the connection between the shape of the predicted eigenfunctions and the formation of particle-clusters. Finally, we compare the results of the present study with those of earlier studies based on different flow models.

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