

Abstract Submitted
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Dispersion of capillary waves in elliptical cylindrical jets GHOBAD AMINI, ALI DOLATABADI, Concordia University — In this work motion of a low speed liquid jet issuing from an elliptic orifice through the air is studied. Mathematical solution of viscous free-surface flow for this asymmetric geometry is simplified by using one-dimensional Cosserat (directed curve) equations which can be assumed as a low order form of Navier-Stokes equations for slender jets. Linear solution is performed and temporal and spatial dispersion equations are derived. Growth rate and phase speed of unstable and stable modes under various conditions are presented. The possibility of instability of asymmetric disturbances is studied too. With distance down the jet, major and minor axes are altered and finally jet breaks up due to capillary instability. The effect of jet velocity and viscosity and also orifice ellipticity on axis-switching and breakup is investigated.

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