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Global frequency response analysis of gravitationally stretched liquid jets[1] PAULA CONSOLI-LIZZI, WILFRIED COENEN, ALEJANDRO SEVILLA, Área de Mecánica de Fluidos, Dpto. de Ingeniería Térmica y de Fluidos, Universidad Carlos III de Madrid, Spain — The convective capillary break-up of freely falling axisymmetric jets of Newtonian liquid is theoretically studied with a one-dimensional description of the mass and momentum conservation equations. Instead of using the classical quasi-parallel assumption in the stability analysis, here we compute the global linear response of the flow to harmonic inputs at the exit of the jet, allowing us to predict its break-up length in cases where the base flow is not slender. Our theory compares favourably with recent experiments by Javadi *et al.* (PRL 110, 144501, 2013), who measured the break-up length of unforced liquid jets of several viscosities. From the physical point of view, our main finding is that the meniscus region near the injector outlet, where the jet experiences the strongest axial stretching, delays the growth of capillary disturbances due to a *spatial* counterpart of the kinematic stabilizing mechanism firstly described by Tomotika (Proc. Roy. Soc. 153, 1936) in a *temporal* setting.

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