The Effect of Orifice Eccentricity on Instability of Liquid Jets
GHOBAD AMINI[1], ALI DOLATABADI[2], Concordia University — The hydrodynamic instability of inviscid jets issuing from elliptic orifices is studied. A linear stability analysis is presented for liquid jets that includes the effect of the surrounding gas and an explicit dispersion equation is derived for waves on an infinite uniform jet column. Elliptic configuration has two extreme cases; round jet when ratio of minor to major axis is unity and plane sheet when this ratio approaches zero. Dispersion equation of elliptic jet is approximated for large and small aspect ratios considering asymptotic of the dispersion equation. In case of aspect ratio equal to one, the dispersion equation is analogous to one of the circular jets derived by Yang [1]. In case of aspect ratio approaches zero, the behavior of waves is qualitatively similar to that of long waves on a two dimensional liquid jets and the varicose and sinuous modes are predicted [2]. The growth rate of initial disturbances for various azimuthal modes has been presented in a wide range of disturbances.

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