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Transience to Instabilty in a Liquid Sheet NATHANIEL BARLOW, S.P. LIN, BRIAN HELENBROOK, Clarkson University — Series solutions are found which describe the evolution to absolute and convective instability in an inviscid liquid sheet flowing in an ambient gas and subject to a localized perturbation. These solutions are used to validate spatio-temporal stability predictions for sinuous and varicose modes. We show how recent disagreements in growth predictions stem from assumptions made when arriving at the Fourier integral response. Certain initial conditions eliminate (or reduce the order of) singularities in the Fourier integral. For the sinuous mode, deLuca and Costa (1997) predicted that an impulsive disturbance spreads both upstream and downstream and grows like $t^{1/3}$ when the Weber number is smaller than one. If a Gaussian perturbation is applied to both the position and velocity of the sheet, we observe this behavior in our series solution. However, when the initial disturbance velocity is taken to be zero, we find that the origin decays like $t^{-2/3}$. This is the growth predicted by Luchini (2004).

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