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Contact line instability of a liquid rivulet partially wetting an inclined plane¹ A.G. GONZALEZ, J.A. DIEZ, IFAS, Universidad Nac. del Centro de la Prov. de Buenos Aires, Tandil, Argentina, L. KONDIC, Dept. of Mathematical Sciences, Center for Applied Mathematics and Statistics, New Jersey Inst. of Technology, Newark, NJ — We analyze the stability of a liquid rivulet of cross section, A , positioned across a plane with inclination angle, α . The liquid partially wets the substrate with a static contact angle, θ_0 , when the substrate is horizontal. The contact line stability is studied using the lubrication approximation and with a slip model. Both normal and parallel components of gravity are included. A static solution exists for small α 's and its linear stability is considered. We use an pseudo-spectral Chebyshev method with a combination of basis functions that automatically satisfies the conditions at the contact lines. We analyze the effects of A , θ_0 and α on the predictions of the model, such as stability regions, the maximum growth rate and the behavior of most unstable perturbation. Experiments with silicone oils spreading on a coated glass substrate are considered for a number of different fluid volumes and α 's. We find a good agreement between the wavelength of maximum growth predicted by the model and the experimental average distance between drops.

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