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Stability of finite and infinite fluid rivulets JAVIER DIEZ, Instituto de Física Arroyo Seco, Universidad Nacional del Centro, LOU KONDIC, Department of Mathematics, New Jersey Institute of Technology — We discuss the stability and possible breakup of a finite fluid rivulet on a horizontal substrate under partial wetting conditions, recently considered experimentally (Euro. Phys. Lett. 77, 44001 (2007)). To better understand this configuration, we revisit the classical problem of an infinite rivulet and discuss the similarities and differences between these two problems, with particular emphasis on understanding finite size effects. The research is carried out by means of 3D simulations under lubrication approximation. Partial wetting conditions are modeled by using disjoining and conjoining pressure terms. The results show that the early stages of the instability are in agreement with the linear stability calculations, also performed in this work. The nonlinear evolution leads to the formation of isolated drops, similarly to what is observed in experiments. We compare and discuss the differences between the finite and infinite rivulets, in addition to discussing the differences between strip stability, and stability of (semi)infinite films considered recently (Phys. Fluids 19, 072107 (2007)).

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