**On contact line induced instability in flow of hanging fluid films**

TE-SHENG LIN, LOU KONDIC, New Jersey Institute of technology — We consider free surface instabilities of films hanging on inverted substrates within the framework of lubrication approximation. Contrary to all the previous works, we include fluid fronts in formulation. It is found that the presence of contact lines leads to free surface instabilities of convective type without any additional natural or excited perturbations. A single parameter $D = (3Ca)^{1/3} \cot \alpha$ , where $Ca$ is the capillary number and $\alpha$ is the inclination angle, is identified as a governing parameter in the problem. This parameter may be interpreted to reflect the combined effect of inclination angle, film thickness, Reynolds number and the fluid flux. Variation of D leads to change of the wave-like properties of the instabilities, allowing to observe traveling wave behavior, mixed waves, and the waves resembling solitary ones, which were observed in many other unstable flows.

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