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Effect of surfactants on inverted thin film flow DOMINIC HENRY, JAMAL UDDIN, University of Birmingham, JEREMY MARSTON, Texas Tech University, MOHAMMAD MANSOOR, SIGURDUR THORODDSEN, King Abdullah University of Science and Technology — We investigate the stability of a thin film containing insoluble surfactant that is flowing along the underside of an inclined plane, sloped at an angle θ, taking the small θ limit so that the incline is near horizontal. Two cases are examined; as well as a single layered film, a two-layer film is considered whereby each liquid layer contains surfactant. The waveless solution in both cases is perturbed and a linear stability analysis conducted, with a discussion on the corresponding growth rates of the perturbations. This work is then compared to an experimental investigation, whereby the underside of a slide-fed coating die is considered as the inclined plane, and a series of liquid threads are formed with a uniform spacing. This thread spacing is compared to the most unstable mode of the preceding stability analysis, shown to improve upon the classical Rayleigh-Taylor wavelength which considers a constant surface tension.

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