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Spin coating flow of Power law fluid: spreading and contact line intsability[1] PANKAJ DOSHI, National Chemical Laboratory, Pune, India, AKASH ARORA, Department of Chemical Engineering and Material Science, University of Minnesota — A computational study of the flow of a power law fluid on a spinning disc is considered here. The main goal of this work is to examine the effect of shear thinning nature on the flow development and associated contact line instability. The governing mass and momentum balance equations are simplified using the lubrication theory. The resulting model equation is a fourth order non-linear PDE which describes the spatial and temporal evolution of film thickness. The movement of contact line is modeled using a constant angle slip model. To solve this moving boundary problem, a numerical method is developed using a Galerkin finite element method (G/FEM) based approach. The numerical results show that the spreading rate of the fluid increases with the increase in the shear-thinning character of the fluid. It is also observed that the sharpness of capillary ridge is reduced as the shear-thinning character of the fluid becomes dominant. In order to study the stability of these ridges, linear stability theory is developed for shear thinning fluid. The dispersion relationship depicting the growth rate for a given wave number have been reported and compared for different power-law fluids. It is found that the growth rate of the fingers decreases as the fluid becomes more shear-thinning in

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