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Back to a classical problem: A fresh look at the asymptotics of the moving contact line DAVID SIBLEY, ANDREAS NOLD, SERAFIM KALLIADASIS, Imperial College London — For contact line motion where the full Stokes flow equations hold, full matched asymptotic solutions using slip models have been obtained for droplet spreading and more general geometries, e.g. in the well-known results of Hocking and Cox. These solutions to the singular perturbation problem in the slip length, however, all involve matching through an intermediate region that is taken to be separate from the outer and inner regions and on the basis that the two do not match directly. Here, we show that not only is direct matching possible but the intermediate region is in fact an overlap region representing extensions of both the outer and the inner regions. In particular, we investigate in detail how a previously seen result of the matching of the cubes of the free surface slope is justified in the lubrication setting. We also extend this two-region direct matching to the more general Stokes flow case, offering a new perspective on the asymptotics of the moving contact line problem.

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