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The dynamics of a vesicle during adhesion processes[1] MAURICE BLOUNT, MICHAEL MIKSIS, STEPHEN DAVIS, Northwestern University — We analyze the adhesion of a two-dimensional vesicle to a flat substrate by a long-range attractive, short-range repulsive force, in the asymptotic limit that the length scale on which this force acts is much smaller than the vesicle's perimeter. As the vesicle is pulled down towards the substrate, a thin wetting layer is trapped underneath it whose thickness is determined by the adhesive force. At the edges of this wetting layer are boundary layers whose evolution is governed by adhesive, bending and viscous stresses. We use a lubrication approximation to describe the fluid flow inside these boundary-layer regions, and we show how these regions control the dynamics of the remainder of the vesicle. We obtain traveling-wave solutions for the lubrication flow and discuss their relevance during the adhesive process.

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Maurice Blount
Northwestern University

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