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Numerical Studies of the Aspiration of Small Drops Using a Micropipette GARY LEAL, ARUN RAMCHANDRAN, Univ. of California, Santa Barbara — Aspiration of small drops, vesicles, or biological cells using a micropipette has been used as a means of characterizing the properties of the interface or membrane. The basic idea is that the shape of the deformable particle can be imaged, and this data can be translated into information about the interface or membrane properties by comparison with theoretical predictions. For the simple case of a drop, there is a critical condition of flow rate or pressure drop that depends on the interfacial tension (among other parameters) beyond which the drop is aspirated completely into the pipette. With a proper theory, this critical condition can then be used to determine the interfacial tension. Experiments to date when interpreted using a static force balance (neglecting all viscous forces) yield literature values for the interfacial tension. In this study, we use axisymmetric boundary integral methods for drops of different sizes relative to the pipette and different viscosities relative to the suspending fluid, in order to establish the range of validity of this simple method of data interpretation.

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