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Drop Stability on Leaves[1] WILL BLACKMORE, YONGKANG CHEN, CHRIS HINOJOSA, RYAN JENSON, DUC NGUYEN, ANDREW WOLLMAN, MARK WEISLOGEL, Portland State University — The stability of drops on surfaces has implications to many natural and industrial processes. Critical configurational drop stability is defined herein as any change in a control parameter (i.e. drop volume) that leads to movement to a new location on the surface and/or detachment from the surface. The configurational stability of 'wall-bound drops" is enhanced by contact line pinning at sharp edges. In this work an extensive array of computations are performed for "wall-edge-vertex bound drops" (a.k.a. drops on blade tips or drops on leaf tips which they resemble). The numerical approach applies the Surface Evolver algorithm through implementation of a new file layer and a multi-parameter sweep function. As a consequence, thousands of critical drop configurations are efficiently computed as functions of contact angle, blade edge vertex half-angle, and g-orientation. Simple experiments are performed to benchmark the computations which are then correlated for ease of application. It is shown that sessile, pendent, and wall-edge bound drops are only limiting cases of the more generalized blade-bound drops, and that the ubiquitous "dry leaf tip" is observed for a range of the critical geometric and wetting parameters.

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