The Shape of a Sessile Drop BHARADWAJ PRABHALA, MA-
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— Contact angle is an important parameter which characterizes the interaction be-
tween the liquid and solid surface. Based upon the contact angle solid substrates are
primarily classified as hydrophilic, hydrophobic and super hydrophobic substrates.
In this study, we investigate the dependence of the local contact angles on the con-
figuration of the contact line shape of a sessile liquid drop on a solid substrate. We
use the numerical algorithm 'Surface Evolver' which is an interactive program for
the study of surfaces shaped by surface tension, gravitational and other energies.
The algorithm calculates the velocity at each vertex and the vertex is moved in the
direction such that the surface evolves towards a minimum energy. The shapes and
the energies of the drop are computed using the Surface Evolver. An analytical
solution based on perturbation expansion is developed to predict the shape of the
sessile drop for a given contact line description. The shape of the contact line is
also varied in the same manner and the exact drop shape is computed in Surface
Evolver. The Root Mean Square error is calculated by comparing the radius at all
the vertices between the analytical and numerical approaches for varying contact an-
gles and amplitudes of undulations. We show that the applicability of the analytical
solution is quite widespread.

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Date submitted: 11 Aug 2009   Electronic form version 1.4