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Approximate analytical descriptions of the stationary single-vortex Marangoni convection inside an evaporating sessile droplet of capillary size LEV BARASH, Landau Institute for Theoretical Physics — Three versions of an approximate analytical description of the stationary single vortex Marangoni convection in an axially symmetrical sessile drop of capillary size are studied for arbitrary contact angle and compared with the results of numerical simulations. The first approach is heuristic extension of the well-known lubrication approximation. Two other new descriptions are developed for arbitrary contact angle and named $n\tau$- and rz-description. They are free from most of restrictive assumptions of the lubrication approach. For droplets with large contact angles they result in better accuracy compared to the heuristic extension of the lubrication approach, which still gives reasonable results within the accuracy 10-30 per cent. For droplets with small contact angles all three analytical descriptions well agree with the numerical data.

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