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On the structure of Marangoni-driven singularities ROUSLAN KRECHETNIKOV, University of California at Santa Barbara — This work presents an analytical study of the structure of steady Marangoni-driven singularities. While the results are applicable to a wide class of phenomena, the analysis is performed on the example of tip-streaming, which is driven by chemical-reaction producing a surfactant at the interface of a two-phase system. Due to the conical symmetry of the problem, there exist self-similar solutions of the Stokes equations, which are singular at the tip and thus provide no information on the thread structure which is responsible for tip-streaming. This cone-tip singularity is resolved with the help of asymptotic matching of the self-similar and thread solutions using thin layer (slender jet) approximation, which gives explicit asymptotic formulas for the scaling of the thread radius and thus of the emitted droplets as a function of physical parameters.

Rouslan Krechetnikov
University of California at Santa Barbara

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