

1032-76-198

Vladimir Ajaev* (ajae@smu.edu), Department of Mathematics, Southern Methodist University, Dallas, TX 75275, and **Rouslan Krechetnikov**, University of Alberta. *Application of complex analysis to the selective withdrawal problem.*

A common experimental set-up for studying formation of cusp-like features of fluid interfaces involves a tube immersed in a container with two viscous liquids separated by initially flat interface. The tip of the tube is placed at a finite distance above the interface and the upper liquid is withdrawn through the tube. As a result, the interface is deformed into an axisymmetric hump; its curvature increases sharply as the flow rate is increased. This situation is very difficult to simulate numerically due to the requirement of very high resolution for the fluid interface in the region of high curvature. We propose using complex analysis approach to investigate the nature of the experimentally observed behavior of the interface. The complex stress-stream functions are expressed using the Goursat representation for biharmonic functions. The conformal mapping technique is used to find the interface shape; flow pattern near the cusp-like region of the interface is also discussed. (Received August 21, 2007)