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Effect of Surfactant on the Thin-Film in Landau-Levich (in Coating Theory) and Bretherton Problems (bubbles in capillary tube)

In the literature, there are experimental and computational results on the effect of surfactant on the thickness of thin films in Landau-Levich drag coating problem and Bretherton's bubble movement problem through a capillary tube. In this talk, we will first review these results. In both of these problems surfactant thickens the thin-film. Using lubrication approximation and asymptotic methods, we will prove these thickening effects. In the case of drag-out coating problem, the proof will be based on results on the upper bound of film thickness. However, in the case of motion of bubbles through a capillary tube the proof is somewhat along the similar lines. There are some open interesting problems that will also be discussed. The research is supported by Qatar National Research Fund and is partially based on a joint work with Dr. Gelu Pasa.

BIOGRAPHY

Dr. Prabir Daripa is Professor of Mathematics at Texas A&M University. He received his B. Tech. form IIT Kharagpur in 1978, and M.S. and Ph.D. in Applied Mathematics from Brown University in 1983 and 1985, respectively. Dr. Prabir was a Brown University Fellow. He was a Post-doc at Courant Institute, NYU from 1985-1987. Dr. Daripa joined Texas A&M University as an Assistant Professor in 1987.

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