

1086-76-2918

Stuart Kent* (skent@math.arizona.edu) and **Shankar Venkataramani**. *Singularities in Free interface problems and Universality*.

We explore an analogy between microelectromechanical systems (MEMS), in which an elastic conducting plate is deflected by an applied potential, and selective withdrawal systems, in which a fluid interface is deflected by a viscous flow. These systems show a rich bifurcation structure, and potential singularities in the equilibrium interfaces as the forcing strength is increased. Both systems are typified by a feedback between sharp geometry of the interface and high stresses (electrostatic in the first case; viscous in the latter).

This feedback presents a challenge to the analysis of this problem. We describe an asymptotic matching technique for conformal maps which we apply to solve the strong deflection regime for the electrostatic problem. We also discuss the extension of these methods to the fluid flow problem, and the universality classes/types of singularities for free interface problems. (Received September 26, 2012)