

1070-76-47

Ellen R Peterson* (ellenp@andrew.cmu.edu), Department of Mathematical Sciences, Wean Hall 6113, Carnegie Mellon University, Pittsburgh, PA 15208. *Behavior of a droplet of fluid on a thin liquid film*. Preliminary report.

We consider an initially uniform thin layer of fluid on a horizontal substrate. An aqueous droplet is then deposited on the layer and the spreading behavior is observed. The axisymmetric spreading of the droplet on the underlying fluid is modeled as two layer flow using the lubrication approximation. At the interface between the mucin layer, droplet, and air, a contact line discontinuity occurs. We track the location of the contact line and divide the solution into three components in terms of the interface: the mucin/air interface, the mucin/droplet interface, and the droplet/air interface. The system of fourth order nonlinear equations modeling the solution consists of three partial differential equations (one for each interface) and an ordinary differential equation which tracks the location of the contact line. We further investigate the case where the lens spreads to a static state and how the solution changes as the surface tension of the fluids change. This investigation is a first step for an exploration of an aerosol drug treatment for cystic fibrosis patients. (Received January 03, 2011)