1014-76-568 **Rachel Levy*** (rlevy@math.duke.edu), Mathematics Department, Duke University, Box 90320, Durham, NC 27708-0320. *The Motion of a Thin Liquid Film Driven by Surfactant and Gravity.*

Thin liquid films driven by surfactant on an inclined plane exhibit a rich variety of wave structures that can be understood as a combination of linear and non-linear traveling waves and similarity solutions. Surfactant is used to lower the surface tension of liquids, and is present naturally in the lungs as well as commonly found in industrial applications. We consider a system of two non-linear PDE that describe the height of the film and surfactant concentration, derived from the incompressible Navier-Stokes equations and the lubrication approximation for thin films. Using a combination of analytical and numerical results, we explore several types of wave structures that arise for different initial conditions, such as a droplet of liquid or liquid supplied from a reservoir. (Received September 20, 2005)