1086-49-505   **Irene Fonseca*** (`fonseca@andrew.cmu.edu`), Department of Math. Sciences, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213. *Variational Methods for Crystal Surface Instability.*

Using the calculus of variations it is shown that important qualitative features of the equilibrium shape of a material void in a linearly elastic solid may be deduced from smoothness and convexity properties of the interfacial energy.

In addition, short time existence, uniqueness, and regularityy for an anisotropic surface diffusion evolution equation with curvature regularization are proved in the context of epitaxially strained two-dimensional films. This is achieved by using the H^{-1}-gradient flow structure of the evolution law, via De Giorgi's minimizing movements. This seems to be the first short time existence result for a surface diffusion type geometric evolution equation in the presence of elasticity. (Received September 05, 2012)

1