

E. Fried: Stability and Bifurcation of Flexible Filaments Spanned by Fluid Films

A class of variational problems describing the equilibrium of a flexible filament spanned by a fluid film will be presented and discussed, with an emphasis on understanding the stability and bifurcation of flat, circular configurations. Chief among these problems is that involving the Kirchhoff-Canham-Helfrich functional, which arises on modeling as an inextensible filament endowed with elastic resistance to bending and twisting and endowing the fluid film with surface tension and elastic resistance to bending. Various approaches to the singular limit that arises on neglecting the bending resistance of the fluid film, for which the spanning surface must have zero mean curvature, will also be considered.