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Thomas Hagen* (thagen@memphis.edu), Department of Mathematical Sciences, The University of Memphis, Dunn Hall 368, Memphis, TN 38152. *Elliptic estimates and asymptotic regularity for the linearized equations of non-isothermal free liquid film flow.*

This presentation gives a rigorous analytical study about the long-term regularity of solutions of Yeow's linearized equations of free liquid films. These averaged equations describe the motion of a viscous free fluid film under the action of an axial pulling force when fluid solidification occurs along a sharp, a priori unknown interface along the thin fluid sheet.

While it has been shown previously that the related isothermal regime of these equations can be analyzed in a Hilbert space setting, the same approach fails in the nonisothermal case. Instead, the moving interface and its coupling to the temperature equations necessitate a Banach space in between L^1 and L^2 as state space. The central result of this work will be the eventual compactness of the governing semigroup via novel elliptic estimates for the momentum equations. (Received January 18, 2007)