

1145-I1-2097      **Laurel A Ohm\*** (ohmxx039@umn.edu). *Theoretical justification and error analysis for slender body theory.*

Slender body theory facilitates computational simulations of thin fibers immersed in a viscous fluid by approximating each fiber as a one-dimensional curve of point forces. We develop a PDE framework for analyzing the error introduced by approximating a truly three-dimensional object in Stokes flow by a one-dimensional curve. In particular, given a 1D force specified along the fiber centerline, we define a notion of 'true' solution to the full 3D slender body problem and obtain an error estimate for the slender body approximation in terms of the fiber radius. In this talk, we will treat both closed filaments and free endpoints, with attention devoted to the additional difficulties that the free end case presents. (Received September 24, 2018)