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

Slender body theory facilitates computational simulations of thin filaments in a 3D viscous fluid by approximating the hydrodynamic effect of each fiber as the flow due to a line force density along a 1D curve. We develop a PDE framework for analyzing the error introduced by this approximation. In particular, given a 1D force 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. We also discuss further results for free-ended and rigid filaments. (Received August 08, 2019)