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Laurel A Ohm* (ohmxx039@umn.edu). *Slender body theory: an error analysis*. Preliminary report.

Slender body theory is a commonly-used approximation in modeling the dynamics of thin fibers immersed in a viscous fluid in three dimensions. The approximation treats a thin fiber as 1D distribution of point forces, coupled with a fiber integrity condition. Despite the ubiquity of numerical methods and results based on slender body theory, very little analytical work has been done to quantify the error introduced by approximating a three-dimensional fiber as a one-dimensional force distribution, and to verify convergence of the slender body solution to the true solution as the body radius goes to zero. Here, we present a PDE reformulation of the question slender body theory aims to solve and derive a convergence result for the slender body approximation to the true solution. (Received September 20, 2016)