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Parameter Estimation for Micro-swimmers with Fully Resolved Hydrodynamics[1] SARAH OLSON, Worcester Polytechnic Institute, KAREN LARSON, ANASTASIOS MATZAVINOS, Brown University — Due to the computational complexity of micro-swimmer models with fully resolved hydrodynamics, parameter estimation has been prohibitively expensive. We utilize a highly parallelizable Bayesian uncertainty quantification framework to estimate parameters from noisy data. In test cases, we utilize regularized fundamental solutions in a Lagrangian framework to calculate velocities of the swimmer and the force model of the swimmer is determined via an Euler elastica model with nonlinearities due to a preferred curvature. Results show that we can estimate both fluid and elastic swimmer parameters when using noisy swimmer trajectory data at 30 Hz. This methodology can be used to develop artificial micro-swimmers and understand parameter ranges that allow for certain motility patterns.

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