

Abstract Submitted
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Comprehensive modeling of hydrodynamic forces and torques on non-spherical particles using the PIEP model¹ W. C. MOORE, S. BALACHANDAR, YUNCHAO YANG, University of Florida — The first aim of this work is to present a general formulation for the force and torque experienced by an isolated non-spherical particle. Then, a working model is introduced for a spheroid subject to uniform flow. To construct this model, particle resolved direct numerical simulations (PRDNS) of flow around a spheroid are performed for sub-critical Reynolds numbers. These PRDNS consider various angles of attack, rotational Reynolds numbers, and axes of rotation. The pairwise interaction extended point-particle (PIEP) model is then utilized to model a spheroid as three spheres, and extensions to other geometries, such as cubes as superposition of nine spheres, are being considered. Lastly, this model is used to predict the dynamics of a settling spheroid. The model's results are compared to PRDNS results.

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