

Department of Mechanical Engineering

ME537 Multiphase Flows

Homework 2. Assigned 10-24-18, due 11-11-18

Read and comment the papers

“The motion of small spherical particles in a cellular flow field”, M. Maxey, 1987, Physics of Fluids, 30, 7, pp 1915-1928. and
“Chaotic Dynamics of Particle Dispersion in Fluids” L.P. Wang, M. Maxey, T.D. Burton, D.E. Stock, 1992, Physics of Fluids A, 4, 8, pp 1789-1804 in the context of the dynamics of inertial particles.

- Relate the parameter A described in the first paper to the Stokes number we have defined in class. Explain the physical meaning in the context of this paper's flow field.
- Describe the influence of different terms (drag, added mass, gravity, ...) on the dynamics of the particles.
- Comment on the effect of the flow field (and more broadly on a turbulence like vorticity field) on the settling or rise velocity of particles immersed in this type of flows.