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Many-Sphere Hydrodynamic Interactions: Weak Convective Inertia Effects

I.T. Pienkowska

Polish Academy of Sciences, IPPT, Warsaw, Poland

Oseen flows past a finite number of rigid spheres are considered in the régime of low Reynolds numbers. The many-sphere hydrodynamic interactions are described in terms of the multiple scattering processes. The hydrodynamic forces, experienced by the spheres, are expressed in the form of the infinite series, presenting the dependence of these forces on the spatial configuration of the spheres and on the convective inertia of the fluid. The obtained solutions to the Oseen boundary value problem are applied to examine the solutions to the analogous Navier–Stokes boundary value problem, at small data, in the sense of Finn (Robert Finn, ARMA 19, 363 (1965)).

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