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General solutions of the Stokes flow — Lamb's solution and multipole expansion¹ KENGO ICHIKI, Mech. Eng., Johns Hopkins Univ. — The objective of this talk is to relate the two major representations of the Stokes flow; Lamb's general solution (Lamb 1932, and Happel and Brenner 1973) and the multipole expansion of the Oseen tensor (Ichiki 2002). For low Reynolds number hydrodynamics, the governing equation is the Stokes equation, which is a linear partial differential equation. The general solution can be obtained by the conventional potential theory and we have a lot of equivalent representations. It is obvious that these various formulations are mathematically equivalent. However, to the author's knowledge, the relations among them are limited (Weinbaum and Ganatos 1990, and Kim and Karrila 1991). Here we write Lamb's solution by Cartesian tensors and express the force moments on particles by the Lamb's solution. Using this relation, we compare the suspension stress expressed by Lamb's solution (Tanksley and Prosperetti 2001) with that by force moments.

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Prefer Oral Session

Prefer Poster Session

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