P.15 The reciprocal theorem for two objects

D Papavassiliou

University of Warwick, UK

The reciprocal theorem for Stokes flows has become a standard tool in the study of the motion of objects in a viscous fluid with no net forces, such as swimming microorganisms or artificial self-propelled particles. Here we present an extension of this principle to study the pairwise interactions of such objects with each other in three simple cases, using complex variable techniques: a) diffusiophoretic interaction of an isotropic spherical source with a fixed or free inert object; b) a pair of simple Janus-like spherical swimmers; and c) a pair of treadmilling swimmers with dipolar flow fields. We find hydrodynamically bound chains of simple swimmers, and a quasi-stable configuration of treadmillers reminiscent of the celebrated 'waltzing' of Volvox colonies.