

عنوان مقاله:

THE SEDIMENTATION OF SLIM FLEXIBLE PARTICLES IN STOKES FLOW

محل انتشار:

همایش یافته های نوین در هوافضا و علوم وابسته (سال: 1394)

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خلاصه مقاله:

Knowing the dynamics of flexible particles sedimenting in fluids is critical to understand many flows arising in physics, biology and engineering. Many of these particles have slim shape, such as filaments. Generally simulation of such problems is very costly with general methods. Instead, we have employed a non-local model (n-LM) to investigate the deformation and transport of these slim particles sedimenting in a quiescent, viscous, incompressible fluid without any appreciable inertia effects. We have considered the particles as aslender body with small Slenderness-parameter (formol in Abstract) The n-LM is chosen because of its simplicity, stability and low computational cost. In this method, the filament dynamic equations are developed by balancing viscous, elastic and gravitational forces including non-local interactions. We have explored two filaments with different flexibility which is characterized by two dimensionless numbers termed Elasto-gravitation, ϵ , and SP. It is observed that contrary to the weakly flexible filament which finally reaches to an equilibrium state, HF-filament exhibits a buckling instability. We surveyed the filament buckling which .acts as a periodic motion accompanied by asymmetrical movements along the filament length

کلمات کلیدی:

Keywords: Particle motion, Elastic Buckling Instability, Stokes flow, Sedimentation; Slender Body Theory

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