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Model based prediction of dynamics of particles in particle laden turbulent shear flow PARTHA GOSWAMI, SWAGNIK GHOSH, Dept. of Chemical Engg., Indian Institute of Technology, Bombay — Particle-laden turbulent flows find application in wide range of industrial and natural processes. The advent of fast computing facility has enabled investigation of Particle-laden turbulent flow using Direct Numerical Simulation (DNS). Still simulating such flows in case of practically applicable geometry is still far from the reality. Therefore modeling such flows is inevitable. The proposed fluctuating force and fluctuating torque simulation is such a modeling method in which the effect of fluid velocity and vorticity fluctuations on the particle is modeled as anisotropic Gaussian white noise. For dilute suspensions, strength of the noise is extracted from diffusivity data of unladen fluid phase. The inter-particle and wall-particle collisions are modeled by introducing co-efficient of restitution (e) and roughness factor (β) in hard sphere collision model. Introduction of rotational diffusivity due to fluid vortical structures can predict the detailed rotational dynamics of particle phase. Present investigations have been performed for dilute sheared suspensions for different roughness factor in the limit of high Stokes number. The results obtained are compared with DNS using one-way coupling.

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