Abstract Submitted
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An investigation of particles suspension using smoothed particle hydrodynamics[1] ARMAN PAZOUKI, DAN NEGRUT, University of Wisconsin-Madison — This contribution outlines a method for the direct numerical simulation of rigid body suspensions in a Lagrangian-Lagrangian framework using extended Smoothed Particle Hydrodynamics (XSPH) method. The dynamics of the arbitrarily shaped rigid bodies is fully resolved via Boundary Condition Enforcing (BCE) markers and updated according to the general Newton-Euler equations of motion. The simulation tool, refered to herien as *Chrono::Fluid*, relies on a parallel implementation that runs on Graphics Processing Unit (GPU) cards. The simulation results obtained for transient Poiseuille flow, migration of cylinder and sphere in Poiseuille flow, and distribution of particles at different cross sections of the laminar flow of dilute suspension were respectively within 0.1%, 1%, and 5% confidence interval of analytical and experimental results reported in the literature. It was shown that at low Reynolds number, Re = O(1), the radial migration (a) behaves non-monotonically as the particles relative distance (distance over diameter) increases from zero to two; and (b) decreases as the particle skewness and size increases. The scaling of *Chrono::Fluid* was demonstrated in conjunction with a suspension dynamics analysis in which the number of ellipsoids went up to 3e4.

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Arman Pazouki
University of Wisconsin-Madison

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