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Simulation of Collision of Arbitrary Shape Particles with Wall in a Viscous Fluid. FAZLOLAH MOHAGHEGH, H. S. UDAYKUMAR, University of Iowa — Collision of finite size arbitrary shape particles with wall in a viscous flow is modeled using immersed boundary method. A potential function indicating the distance from the interface is introduced for the particles and the wall. The potential can be defined by using either an analytical expression or level set method. The collision starts when the indicator potentials of the particle and wall are overlapping based on a minimum cut off. A simplified mass spring model is used in order to apply the collision forces. Instead of using a dashpot in order to damp the energy, the spring stiffness is adjusted during the bounce. The results for the case of collision of a falling sphere with the bottom wall agrees well with the experiments. Moreover, it is shown that the results are independent from the minimum collision cut off distance value. Finally, when the particle's shape is ellipsoidal, the rotation of the particle after the collision becomes important and noticeable: At low Stokes number values, the particle almost adheres to the wall in one side and rotates until it reaches the minimum gravitational potential. At high Stokes numbers, the particle bounces and loses the energy until it reaches a situation with low Stokes number.

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