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Euler-Lagrange Simulations of Bedload Transport and Bedform Generation[1] LIHENG GUAN, JORGE SEBASTIAN SALINAS, S. BALACHANDAR, University of Florida — Bedload transport is a subset of sediment transport in which the sediment particles rolls, slides and saltates under the influence of the overlying flow field. The particles in the bedload occasionally gets lifted and gets suspended at high enough flow rate. In this work, the bedload tranport problem is investigated by performing numerical simulations with implementation of Euler-Lagrange point-particle approach. The fluid field is solved on the Eulerian reference frame while the motion of sediment particles are tracked on the Lagrangian reference frame. Moreover, the collisions between particles are handled using a soft-sphere collision model which includes both a normal collision force and a tangential collision force. Additionally, the rotational motion of particles is also considered in this work. In the bedload tranport simulation, a fully developed turbulent channel flow is imposed over an initially flat bed. Various bedform structures, from longitudinal streaks to ripples, arise as the sediment bed evolves. The results are compared with those using Exner's equation.

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