

Abstract Submitted
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Toward reduced-order modeling techniques in granular media

KEN KAMRIN, MIT, HESAM ASKARI, University of Rochester, DAN GOLDMAN, Georgia Tech, QIONG ZHANG, STEPHEN TOWNSEND, MIT — To model the flow of granular media with high accuracy, a number of subtleties arise and complex constitutive relations are needed to address them. However, making certain rheological simplifications produces a framework that is simple enough to obtain global rule-sets that can be used to aid in design without having to solve any partial differential equations or perform discrete element simulations. This talk will show how reduced-order rule-sets such as the Resistive Force Theory can be obtained from a basic frictional plasticity model, and how plasticity can further be used to produce a family of scaling laws in granular locomotion reminiscent of ‘wind tunnel’ scaling laws in fluid dynamics. These are verified with numerical simulations.

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