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Dynamic similarity in granular locomotion KEN KAMRIN, JAMES SLONAKER, QIONG ZHANG, Massachusetts Inst of Tech-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 experiments and numerical simulations.

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