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Improved particle simulation with rigid elasticity? TYLER OLSEN, KEN KAMRIN, Massachusetts Inst of Tech-MIT — There are two primary methods for simulating the dynamic contact interactions between discrete bodies: the discrete element method (DEM) which treats the particles as elastic, and contact dynamics (CD), which assumes rigid particles. CD offers stability at much larger timesteps than DEM. However, it gives rise to indeterminate forces in highly coordinated packings, as the forces are not derived from physical interaction laws. We propose a method to resolve the indeterminacy by imposing an elastic compatibility condition to the contact forces while retaining the stability of CD. We verify the uniqueness of the force solutions of our method by demonstrating cases where traditional CD cannot recover the DEM force distribution.

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