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Validation of a Hertzian contact model with nonlinear damping¹ ADAM SIERAKOWSKI, Johns Hopkins University — Due to limited spatial resolution, most disperse particle simulation methods rely on simplified models for incorporating short-range particle interactions. In this presentation, we introduce a contact model that combines the Hertz elastic restoring force with a nonlinear damping force, requiring only material properties and no tunable parameters. We have implemented the model in a resolved-particle flow solver that implements the Physalis method, which accurately captures hydrodynamic interactions by analytically enforcing the no-slip condition on the particle surface. We summarize the results of a few numerical studies that suggest the validity of the contact model over a range of particle interaction intensities (i.e., collision Stokes numbers) when compared with experimental data.

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