A RIGID MODEL FOR STUDYING STATISTICS AND DYNAMICS OF ELONGATED GRAINS

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We present a dynamical rigid molecular dynamics model for studying the behavior of sheared granular materials as a function of contact mechanics, shear velocity, load, and granular materials composition. We relate the observations to continuum analysis (e.g., Mindlin and Deresiewicz [1]) of granular behavior, and investigate some repercussions of simple micro-mechanical behavior of the granular contact scale to complex behavior on the macro-mechanical (continuum) scale. A number of examples of dynamical response to shearing model granular materials of different contact laws are highlighted. Additionally, from discrete as well as continuum models, we calculate the scale of the elastic regions inside the yield surface.

References

[1] Mindlin, R. D., and Deresiewicz, H. Elastic spheres in contact under varying oblique forces. *ASME Journal of Applied Mechanics*, 53 APM{14 (September 1953), 327-344.