

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Constitutive relations for granular fluid of smooth inelastic hard spheres, to Burnett order** VINAY GUPTA, MEHEBOOB ALAM, JNCASR, Bangalore, India — In the framework of kinetic theory for dilute granular gases, we have generalized the work of Sela & Goldhirsch (1998) by including body force (gravity) term in the Boltzmann equation. In order to derive the constitutive relations for flows of smooth inelastic hard spheres in three dimensions, the Boltzmann equation is perturbatively solved by performing generalized Chapman-Enskog (double expansion) in two small parameters, the Knudsen number and the degree of inelasticity. We have derived the constitutive relations till Burnett order (up to second order in small parameters). In this talk I would like to present the methodology for obtaining the constitutive relations.

Ref: Sela, N. & Goldhirsch, I. 1998 Hydrodynamic equations for rapid flows of smooth inelastic spheres, to Burnett order. *J. Fluid Mech.* **361**, 41–74.

Vinay Gupta  
JNCASR, Bangalore, India

Date submitted: 21 Nov 2010

Electronic form version 1.4