Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Couette and Fourier planar ows for a low density granular gas
FRANCISCO VEGA REYES, VICENTE GARZÓ, ANDRÉS SANTOS, Departamento de Física, Universidad de Extremadura, Spain — We study in this work steady laminar flows in a low density granular gas. Our system is excited by shear and temperature sources at the boundaries (two infinite parallel walls). We describe previously unreported types of non-Newtonian granular flows. We obtain also their corresponding rheologic and hydrodynamic transport coefficients, following three independent methods: 1) an analytical solution, obtained from Grad's method applied to the inelastic Boltzmann equation, 2) a numerical solution of the inelastic Boltzmann equation, obtained by means of the Direct Simulation Monte Carlo method, and 3) molecular dynamics simulations. We show that the three procedures yield the same general classification of planar Fourier and Couette flows for the granular gas.

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Date submitted: 15 Sep 2011 Electronic form version 1.4