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Green-Kubo expressions for transport coefficients of a granular fluid. APARNA BASKARAN, JAMES DUFTY, Department of Physics, University of Florida — A formal derivation of linear hydrodynamics for a granular fluid is given. The linear response to small spatial perturbations of the homogeneous state is studied in detail using methods of nonequilibrium statistical mechanics. A transport matrix for macroscopic excitations in the fluid is defined in terms of the response functions. An expansion in the wavevector to second order allows identification of all phenomenological susceptibilities and transport coefficients through Navier - Stokes order [1]. The transport coefficients in this representation are the generalization of Helfand and Green-Kubo relations to granular fluids. The analysis applies to a wide range of collision rules. Several differences from the corresponding expressions in the elastic limit are noted. Then, the particular case of inelastic hard spheres is considered and some approximate analytical evaluations illustrated. [1] A preliminary report of these results can be found in J. W. Dufty, A. Baskaran and J. J. Brey cond-matt/0507609

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