Base unidirectional steady flows in Navier-Stokes granulodynamics[1] FRANCISCO VEGA REYES, Departamento de Física, Universidad de Extremadura, 06071 Badajoz, Spain, JEFFREY S. URBACH, Department of Physics, Georgetown University — We present the set of steady unidirectional flows that appear, at low density and constant pressure, in a granular gas at Navier-Stokes order. Two basic energy inputs from the boundaries are considered: temperature and shear sources. We find new steady states not previously reported. Explicit expressions of the hydrodynamic profiles for all the existing steady unidirectional flows are for the first time provided. We determine the natural reduced (microscopic over macroscopic) length scales of the problem. This allows to quantitatively determine the range of validity of the Navier-Stokes hydrodynamics. We describe the properties of the base unidirectional flows, focusing in the not previously reported states.

Francisco Vega Reyes
Departamento de Física, Universidad de Extremadura, 06071 Badajoz, Spain

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