

1030-35-16

Michael Shearer* (shearer@ncsu.edu), Department of Mathematics, Center for Research in Scientific Computation, NC State University, Raleigh, NC 27695-8205. *Particle-size segregation in granular flow: a conservation law in two space dimensions*. Preliminary report.

Kinetic sieving is the process by which large particles rise in granular avalanches, while smaller particles fall. Recent models of this effect reduce to a scalar conservation law in two dimensions and time, but with non-constant coefficients, reflecting the shear needed to induce segregation. Various topics of significance to applications are considered using the theory and constructions of scalar hyperbolic equations: steady solutions in which the direction of flow is time-like, leading to a sharp estimate of how long a chute should be to guarantee full segregation; breaking of interfaces, forming an evolving lens-shaped mixture zone; and the connection to recent experiments of Daniels on shear flow, for which the model is adjusted to account for nonuniform shear, with the consequent loss of constant solutions. (Received June 07, 2007)