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Asymmetric flux models for particle-size segregation in granular avalanches PARMESH GAJJAR, NICO GRAY, Univ of Manchester — Particle-size segregation commonly occurs in dense shallow flows of grains down an incline, through the combined processes of *kinetic sieving* and *squeeze expulsion*. Recent experimental observations suggest that a single small particle can percolate downwards through a matrix of large particles faster, than a single large particle can be levered upwards through a matrix of fines. In this work, this asymmetry is modelled using a segregation flux that is dependent only on the small particle concentration. The flux function is asymmetric about its maximum point, differing from the symmetric quadratic form used in recent models of particle size-segregation, and a cubic flux function is used in this work for illustration. Exact solutions are presented for steady non-diffuse flow in two dimensions with both a homogeneously mixed and normally graded inflow, as well as for a steady-state breaking wave. The new asymmetric flux results in a concentration dependence on both the distance to fully segregate, and the length of the breaking wave.

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