Well-posed and ill-posed behaviour of the $\mu(I)$-rheology for granular flows

Thomas P. Barker$^1$

$^1$ School of Mathematics and Manchester Centre for Nonlinear Dynamics, University of Manchester, Oxford Road, Manchester M13 9PL, UK
e-mail : thomas.barker@manchester.ac.uk

Key Words: Granular, Ill-posed, Rheology

The stability of the continuum equations for dense granular flow, formed with a recently proposed rheology, is assessed. This investigation consists of a linear stability analysis vindicated by numerical studies. It is found that for variation in the flow and/or constituent properties, there exists regions for which perturbations to the flow grow and regions for which they decay. Interestingly, the result appears to complement the known modelling limitations with break-down occurring in regions of parameter space where additional physics are known to dominate.