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Size and density segregation in granular mixtures[1] DEEPAK TUNUGUNTLA, THOMAS WEINHART, ANTHONY THORNTON, Multi-scale Mechanics group, University of Twente — In recent years, quite a few mixture theory continuum models, e.g., Tunuguntla et al. (2014), have attempted to, qualitatively and quantitatively, predict particle segregation in bidisperse mixture flows over inclined channels. This ongoing continuum approach incorporates percolation-driven segregation phenomenon into a continuum transport equation given in terms of particle volume fraction of a particular species. The key feature behind these models lies upon the fact on how the total bulk pressure is distributed among the two particle species. Thereby, indicating the need for suitable pressure scalings which help us determine the proportion of the bulk pressure to be carried by each type of particle species. To investigate this in detail, fully three dimensional discrete particle simulations (DPMs) are used. Further, we project the discrete data onto a continuum field using the novel coarse graining technique, see Tunuguntla et al. (2015). With these constructed macroscopic fields, such as the partial and bulk stresses, at hand, we arrive at suitable pressure scalings taking into the effects of both particle particle size and density. Thence, providing us with DPMs validated pressure scalings required to predict particle segregation more accurately.

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