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Uncertainty quantification of the multiphase Discrete Element Model at novel test-rig using in-house algorithms

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There is a high demand for accurate and fast numerical models for dense granular flows in many industrial applications. Different models are now commonly used to simulate granular flows, as e.g. Hybrid Euler-Lagrange (HEL) and Discrete Element Method (DEM) [1]. In this study, the uncertainty quantification for the DEM model was performed based on selected quantities of interest (QOI), which were measured at a test rig. Various correlations between the input and output data were investigated to assess the impact of the possible input data errors on the output values determined by the solver. The results were validated against the measurement data from a novel in-house experimental test rig. The procedure for assessment of the simulation input data uncertainties onto results, was performed using Dakota® software [2]. The Latin hypercube sampling technique was used to determine test points. Developed and applied OpenSource Computer Vision (OpenCV) algorithm for determining particle motion characteristics from image dataset was used for results determination and postprocessing.

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