PARTICULATE FLOW WITH FREE SURFACES

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Particulate flows and their interaction with structures can be used to model many different engineering problems, among these are environmental problems but also chemical and biomechanical processes. Environmental fluid-solid structure interaction (FSSI) problems are of interest for safety prediction of civil engineering constructions with respect to natural hazards involving severe particulate water flows. In this paper we develop predictive methods based on SPH models that are coupled with discrete elements thus ieading to new particle-based methods including free surface flows. This approach is applied to estimate accurately the dynamics of three dimensional free surface particulate flows and their interaction with constructions accounting for FSSI effects.

The aim is to develop new mathematical models and interaction schemes that are related to the analysis of free surface particulate flows and their interaction with structures. Furthermore new computational methods and software for robust and fast computations will be constructed in order to be able to solve severe particulate flow situations.