Application-Driven Development of CFD-DEM Modelling for Particle-Based Processes

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ABSTRACT

Discrete Element Method (DEM) coupled to Computational Fluid Dynamics (CFD-DEM) is a powerful tool for optimization and design of particle processes. We give an overview of recent developments in the frame of the open source CFD-DEM code CFDEMcoupling[1] and the open source DEM code LIGGGHTS. In particular, we summarize recent implementations of models for spray-particle interaction, particle-particle liquid film transfer and particle-liquid transfer in three phase (liquid, solid particle) systems. We also give an overview on different model strategies for handling solid body motion (e.g. rotors) in coupled CFD-DEM simulations. On a more general level, we also summarize parallelization and code efficiency improvement efforts. These model developments are presented in the context of their industrial applicability ranging from, food processing, agricultural engineering, pharmaceuticals to mining and consumer goods.

REFERENCES

[1] Goniva, C., Kloss, C., Deen, N.G., Kuipers, J.A.M. and Pirker, S. (2012): “Influence of Rolling Friction Modelling on Single Spout Fluidized Bed Simulations”, Particuology, DOI 10.1016/j.partic.2012.05.002