Eulerain-Eulerain approach to study fluidized bed system for design of industrial fluidized bed reactor

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Many chemical, pharmaceutical and food processing plants use fluidized bed system to carry out multi-phase or catalytic reactions. In this work, we have simulated a fluidized bed system, both 2D and 3D using CFD software-ANSYS FLUENT. A two-phase Eulerain-Eulerain approach coupled with kinetics theory of granular flow (KTGF) was applied to simulate the gas-solid flow. Standard k-epsilon model was applied for turbulence model. Momemtum exchange co-efficients are calculated using appropiate drag force function. The work also highlights the investigation of existing drag force models to select the most appropiate model for a given gas-sloid system under consideration.The kinetic energy loss during the particle-particle collision is captured through co-efficient of restitution. Results of simulation, both 2D and 3D were compared with experimental data from literature. The comparison shows the correctness of our simulation model in predicting the hydrodynamics of fluidized bed under consideration, and hence model can be used to carry out design study of a typical fluidized bed reactor.
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