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# Computational simulation of fluidized beds: Kinetic theory approach and applications using FLUENT and MFIX

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Fluidization is the process by which a liquid or gas flows through a particulate solid phase, keeping it under suspension and showing fluid-like behavior. Among applications of FBs, process of energy conversion such as combustion and gasification are the focus of much research nowadays. Research in Computational Fluid Dynamics (CFD) applied to the simulation of FBs has grown in the last few years in view of the need to perform a large number of tests to define appropriate, if not optimal, operational conditions. CFD could provide a low cost test bench in FBs applications. Nevertheless, the mathematical modeling of multiphase - and often reactive - flows in this kind of system is indeed very complex. A possible approach that is much employed is the Euler-Granular modeling, which describes solid and gaseous phases as interpenetrating continua. Furthermore, the stresses of the solid phase, are translated into a stress tensor in the form of a fluid stress tensor, with parameters such as pressure and viscosity obtained from the Kinetic Theory of Granular Flows (KTGF). KTGF is derived from the kinetic theory for dense gases, extrapolated to describe the behavior of small particles inserted in a fluid medium. In this project we have studied the features of the Euler-Granular model and the influence of model parameters in numerical results of flows in bubbling and circulating FBs. We have employed factorial plans to quantify the influence of restitution and specularity coefficients and gas-solid drag laws, and also the interaction among these parameters.

## Biography

Flavia Zinani has completed her PhD in Mechanical Engineering in 2006 at Universidade Federal do Rio Grande do Sul, Brazil. She is a researcher at Unisinos, in themes related to rheology, combustion and numerical simulation of multiphase flows. Her main topic is the statistical study the influence of empirical parameters in an Eulerian model for multiphase flows in fluidized beds.

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