Simulation of a fluidised bed

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EM20B
- **Open to exchange students:** No

Presentation

Objectives

Train students in the use of a massively parallel computational fluid mechanics code for reactive multiphase flows (NEPTUNE_CFD code based on an Euler N-fluid approach) on an industrial scale, applying it to the simulation of gas-particle flows, particularly in fluidized beds.

Description

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- Interactive discussion with students on numerical simulation:
. main stages, organization of an industrial calculation code
. modeling and transition from a physical problem to numerical simulation

. highlighting the key points in solving a real problem and their relationship with the various components of the code: phase properties, boundary conditions, initial conditions, models, diagrams, numerical methods, etc.

- Implementation of the complete calculation chain of a numerical simulation on a dense flow (fluidized bed): creation of the geometry, creation of the mesh, parameterization of the calculation case, choice of models, modification of source files, launch/ compilation/execution of the calculation, visualization and critical analysis of the results and study of the influence of parameters

(link with the process and its optimization). Theoretical review of two-phase flow closure models in terms of interfacial transfer, turbulence in the continuous phase, particle stress modeling and coupling between the continuous and dispersed phases.

- Study of the influence of agitation models on a gas/particle jet: implementation of the calculation chain: geometry, meshing, parameterization of the calculation case, execution, post-processing and physical analysis of the results, study of the influence of the particle agitation model on particle dispersion.
- Design office projects on simplified geometries for multiphase industrial processes with or without heat and material transfer