DNS of particulate flows with collisions using a parallel DEM-DLM/FD method : PeliGRIFF

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ABSTRACT

We present in this paper a Direct Numerical Simulation (DNS) method to tackle the problem of particulate flows at moderate to high concentration and finite Reynolds number. Our method is built on the framework established by Glowinski et al. [1] in the sense that we use their Distributed Lagrange Multiplier/Fictitious Domain (DLM/FD) formulation and their operator-splitting idea. Whereas a simple artificial repulsive force based collision model is usually employed in the literature, we consider in this paper an efficient Discrete Element Method (DEM) granular solver for the treatment of particles collisions. This DEM approach enables us to consider particles of arbitrary shape (at least convex) and to account for actual contacts, meaning that particles actually touch each other. Our code PeliGRIFF [2] is developed under the framework of the full MPI open source platform PELICANS [3]. Originally developped with Finite Element method, we recently extended PeliGRIFF to MAC Finite Volume method. Results comparing FEM against FVM are analysed in terms of accuracy and CPU time as well as results on the 3D fluidization of particles with collisions.

REFERENCES

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