

# A Suspension Balance Model for the flows of non-Brownian Suspensions of hard spheres

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The Suspension Balance Model (Eulerian) (SBM) of Nott and Brady (1994), Morris and Boulay (1999) for the flows of non-Brownian suspensions of hard spheres was implemented in the “OpenFOAM®” open source library.

It captures well the physical features involved in the shear-induced particle migration in simple shear flows. In fact, numerical results obtained with our modified coefficients in Dbouk et al. (2013) suggest that the simplification introduced by Morris and Boulay (1999) in the SBM, is appropriate.

The two-dimensional model was extended into a frame-invariant environment and was extended to include buoyancy effects too (see Dbouk et al. (2012)). The latest solver was implemented also in “OpenFOAM®” and is capable of dealing with general geometries.

Results predicted by the model using “OpenFOAM®” indicated that it can capture well the physical features involved in the shear-induced particle migration even in geometries where the flow of the suspension is general, and where buoyancy is present. This was demonstrated by solving numerically the two-dimensional viscous resuspension and mixing in a horizontal Couette cell problem and comparing simulation results with the measured data of Rhao et al. (2002).

Finally, it can be stated safely that the two-dimensional model described well the physical behaviour of the different suspension flows simulated (in channels & Couette Cells), and could be tested further by simulating additional general flows in more complex geometries.

## References:

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