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DRAG RESISTANCE OVER A 2D SQUARE USING THE MPS METHOD

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A 2D square was placed into a flow of particles domain to determine the drag resistance over it using the Moving Particle Semi-implicit method proposed by S. Koshizuka and Y. Oka [1,2]. After running and fitting the conventional dam break benchmark , the first approach of the flow simulation was stable and successful. For a Reynolds number of $1x10^5$ the obtained drag coefficient based on contributions of pressure and friction forces was in good agreement with data published, Cd= 2.2 [3] and even compared with traditional Fluid Mechanic text books. Particles at the inlet were created if needed in order to maintain an uniform flow with inflow velocity and particles who reached the outlet boundary were simply deleted in the similar way as done by Shibata and Koshuzika[4]. Nonetheless, the particle behaviour showed unphysiscal pressure values on the domain and pressure fluctuations, which had been improved with the aid of the formulation of a high source term, HS, on the right hand side of the Poisson Pressure Equation and the discretization of the Laplacian term using a high order formulation, HL, as proposed by Khayyer and Gotoh [5,6,7]. Hence, results were more fitted to the physical behaviour. Currently, a 3D implementation is carried out in order to obtain results in a similar way to those obtained in 2 dimensions, based on the models proposed by Khayyer and Gotoh [8]

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