

WAVE GENERATION AND ABSORPTION WITH OPENFOAM[®]

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Abstract. *The present paper introduces new functionalities built for OpenFOAM[®] in order to deal with coastal, ocean and offshore engineering problems. OpenFOAM[®] is suitable for these purposes, as it solves the 3D RANS equations for two-phase flows. The current limitations are overcome with new boundary conditions which link wave generation with active wave absorption. Wave generation includes all the widely used theories in 3D, plus specific piston-type wavemaker velocity profile replication. Several active wave absorption theories have also been developed to work in 2D but also in 3D cases, to enhance the stability of the simulations by decreasing the energy of the system and to correct the increasing water level on long simulations. The main advance of this method with respect to dissipation zones is that it does not increase the computational cost. The simulations and results of the paper are purely theoretical, but match the usual working conditions of a wave flume or basin. The results vary depending on the theory used (2D, Quasi-3D and 3D) but overall performance of the implemented methods is usually under the 10% of reflection.*