Numerical Simulation of Lifeboat Launching Using Overset Meshing

Authors : Alok Khaware, Vinay Kumar Gupta, Jean Noel Pederzani

Abstract : Lifeboat launching from marine vessel or offshore platform is one of the important areas of research in offshore applications. With the advancement of computational fluid dynamic simulation (CFD) technology to solve fluid induced motions coupled with Six Degree of Freedom (6DOF), rigid body dynamics solver, it is now possible to predict the motion of the lifeboat precisely in different challenging conditions. Traditionally dynamic remeshing approach is used to solve this kind of problems, but remeshing approach has some bottlenecks to control good quality mesh in transient moving mesh cases. In the present study, an overset method with higher-order interpolation is used to simulate a lifeboat launched from an offshore platform into calm water, and volume of fluid (VOF) method is used to track free surface. Overset mesh consists of a set of overlapping component meshes, which allows complex geometries to be meshed with lesser effort. Good quality mesh with local refinement is generated at the beginning of the simulation and stay unchanged throughout the simulation. Overset mesh accuracy depends on the precise interpolation technique; the present study includes a robust and accurate least square interpolation method, and results obtained with overset mesh shows good agreement with experiment.

Keywords : computational fluid dynamics, free surface flow, lifeboat launching, overset mesh, volume of fluid
Conference Title : ICFD 2017 : International Conference on Fluid Dynamics
Conference Location : London, United Kingdom
Conference Dates : October 19-20, 2017