Numerical Simulation of Fluid Structure Interaction Using Two-Way Method

Authors : Samira Laidaoui, Mohammed Djermane, Nazihe Terfaya

Abstract : The fluid-structure coupling is a natural phenomenon which reflects the effects of two continuums: fluid and structure of different types in the reciprocal action on each other, involving knowledge of elasticity and fluid mechanics. The solution for such problems is based on the relations of continuum mechanics and is mostly solved with numerical methods. It is a computational challenge to solve such problems because of the complex geometries, intricate physics of fluids, and complicated fluid-structure interactions. The way in which the interaction between fluid and solid is described gives the largest opportunity for reducing the computational effort. In this paper, a problem of fluid structure interaction is investigated with two-way coupling method. The formulation Arbitrary Lagrangian-Eulerian (ALE) was used, by considering a dynamic grid, where the solid is described by a Lagrangian formulation and the fluid by a Eulerian formulation. The simulation was made on the ANSYS software.

Keywords : ALE, coupling, FEM, fluid-structure, interaction, one-way method, two-way method
Conference Title : ICCEAM 2016 : International Conference on Civil Engineering and Applied Mechanics
Conference Location : Istanbul, Türkiye
Conference Dates : February 15-16, 2016