

Challenges of Fluid-Structure interaction

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Day by day it can be observed an increasing interest to simultaneously simulate the behaviour of the solid deformations and its interaction with the surrounding fluid. This topic becomes extremely important when solid deformations are large enough to influence the flow by causing flow separation, vortex shedding, instabilities, etc. Hence an understanding of both domains is essential to an accurate simulation. According to this, CD-adapco and Simulia are together committed to provide the state-of-the-art fluid-solid interaction by developing a direct coupling interface between STAR-CD and ABAQUS. The direct coupled interface allows that fluid and structure iterate continuously, since at each time step nodal forces and heat fluxes are passed from STAR-CD to ABAQUS, as well position, displacements and velocity are passed from ABAQUS to STAR-CD. Therefore, this functionality can be applied to a wide range of different industrial sectors where the interactions of fluid-structural responses are significant, such as for instance for the analysis of the tire aquaplaning of the automotive industry, or the simulation of the in-vivo vascular flow of the biomedical applications.