A finite volume algorithm for fluid-structure interaction problems using unstructured meshes BRANISLAV BASARA, AVL List GmbH — The coupled simulation between multiple fluid and solid domains plays an important role in a wide range of multi-physics problems. A simple method is to calculate different computational domains separately by submitting one or more executable codes for each calculation domain and even for solving different physics, and then exchanging data with the so called coupling server which could use a direct data exchange or in-directly via data files. However, nowadays, sophisticated numerical techniques allow separate domains to be solved with the same computational code within one calculation run. The finite volume method based on the collocated variable arrangement and adopted for the general polyhedral control volume is extended here to solve beside fluid flow problems also deformations and stresses in the solid structure. The performance of the method will be demonstrated on a number of fluid flow and stress analysis test cases. Results show that the method can be used as a useful tool for solving fluid-structure interaction problems.

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