Use 2D Unstructured Mesh Finite Volume Method for Simulating Structural Dynamics

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A novel procedure for evaluating the dynamic structural response of elastic solid domains is presented. The ultimate aim of this study is to develop a consistent set of finite volume (FV) methods on unstructured mesh for the analysis of dynamic fluid–structure interaction (FSI). This paper describes a two-dimensional (2D) FV cell-vertex based method for dynamic solid mechanics. A novel matrix-free implicit scheme was developed using the Newmark method and dual time step algorithm and the model is validated with a 2D cantilever test case as well as 2D plate one.

Key Words: finite volume, unstructured meshes; linear elasticity; structural dynamics