

Abstract Submitted
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Fluid-structure interaction simulations of flexible and elastic bodies¹ SUJYESH AANANDH MANJUNATHAN, J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University, College Station, TX, IMAN BORAZJANI, Associate Professor, J. Mike Walker '66 Department of Mechanical Engineering, Texas A&M University, College Station, TX — Fluid structure interaction of flexible and elastic of high aspect ratio finds its application in areas such as propulsion of underwater vehicles, drag reduction and enhanced energy harvesting by utilizing the large scale flow induced deformation experienced by it. Such fluid structure interactions are investigated here using a partitioned approach by coupling curvilinear immersed boundary based fluid solver for incompressible flow with an open-source finite element solver for structures. The dynamic analysis of the elastic structure is approached using Newmark method of implicit direct integration that is unconditionally stable and validated using the method of manufactured solution. The fluid and structure domains are strongly coupled for numerical stability. The coupled solver after validation is used to investigate the influence of leeward attached flexible and elastic plate on agitation and subsidence of vortex induced vibration of circular cylinder.

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Sujyesh Aanandh Manjunathan
Texas A&M University

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