This paper presents two domain decomposition techniques for fixed grid fluid-structure interaction simulations that can be applied to the interaction of general structures with incompressible flows. One approach is based on an overlapping domain decomposition idea while the other uses non-overlapping domains. The first technique combines a fixed grid Chimera approach with Arbitrary Lagrangean Eulerian based methods, the second one is based on an eXtended Finite Element Method (XFEM) strategy. Both techniques are used in a partitioned and strong coupling fluid-structure framework. The usage of such fixed-grid methods considerably increases the range of possible applications. Several test examples demonstrate key features of both methods.

Stichworte:
fluid-structure interaction, extended finite element method, chimera method, fixed grid, domain decomposition, mortar method, lagrange multiplier, ALE

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