NUMERICAL SIMULATION OF 3D FLUID-STRUCTURE INTERACTION

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Abstract

The problem of interaction of an incompressible fluid and an incompressible elastic material in the so-called Arbitrary Lagrangian-Eulerian formulation, including suitable numerical schemes in three space dimensions is studied. We deal with suitable numerical implementation and we compute either an incompressible Newtonian or an incompressible power-law fluid for the liquid part, and Neo-Hookean or Mooney-Rivlin rubber-like materials for the solid part.

The easiest approach, where the problem is decoupled into the fluid part and solid part and the interaction is treated as external boundary condition, is alternated by single continuum formulation. There is the interaction treated as an internal boundary, which does not require any special treatment. This approach is described among others in [1].

References

[1] Jaroslav Hron, Martin Mádlík, Fluid-structure interaction with application in biomechanics, Nonlinear Analysis: Real World Application (2006), doi: 10.1016/j.nonrwa.2006.05.007

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