1171-65-252

Johnny Guzman^{*}, Becky Durst, Erik Burman and Miguel Fernandez. Fully discrete loosely coupled Robin-Robin scheme for incompressible fluid-structure interaction: stability and error analysis. Preliminary report.

We consider a fully discrete loosely coupled scheme for incompressible fluid-structure interaction based on the time semidiscrete splitting method introduced in [Burman, Durst & Guzmán, arXiv:1911.06760]. The splittling method uses a Robin-Robin type coupling that allows for a segregated solution of the solid and the fluid systems, without inner iterations. For the discretisation in space we consider piecewise affine continuous finite elements for all the fields and ensure the inf-sup condition by using a Brezzi-Pitkäranta type pressure stabilization. The interfacial fluid-stresses are evaluated in a variationally consistent fashion, that is shown to admit an equivalent Lagrange multiplier formulation. We prove that the method is unconditionally stable and robust with respect to the amount of added-mass in the system. Furthermore, we provide an error estimate that shows the error in the natural energy norm for the system is $O(T\sqrt{(\Delta t \log \sqrt{h})})$ where T is the final time, Δt the time-step length and h the space discretization parameter. (Received August 18, 2021)