Kai Yang

Stable Discretizations and Robust Block Preconditioners for Fluid-Structure Interaction Systems

109 McAllister Building
Penn State University
University Park
PA 16802
yangkai1001@gmail.com
Jinchao Xu

In our work we develop a family of preconditioners for the linear algebraic systems arising from the arbitrary Lagrangian-Eulerian discretization of some fluid-structure interaction models. After the time discretization, we formulate the fluid-structure interaction equations as saddle point problems and prove the uniform well-posedness of these formulations. Then we discretize the space dimension by finite element methods and prove their uniform well-posedness by two different approaches under appropriate assumptions. The uniform well-posedness makes it possible to design robust block preconditioners for the discretized fluid-structure interaction systems. Numerical examples are presented to demonstrate the robustness of these preconditioners.