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Fast solvers for fluid and structure problems with multiphysics.

In this talk, I will study Multigrid solvers, domain decomposition methods, and preconditioning techniques that used in fluid and structure mechanics. Specifically, for incompressible fluid flow models, the Cahouet-Chabard preconditioner using exact and inexact Multigrid solvers will be theoretically and numerically investigated; For linear elasticity problems, some scalable two-level overlapping Schwarz methods will be introduced and analyzed. Extensions of the preconditioners and the methods to fluid flow interacting with porous media flow model and fluid structure interaction model will also be discussed. (Received September 29, 2016)