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NUMERICAL METHODS FOR COUPLED PROBLEMS INVOLVING FLUIDS AND SOLIDS

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ABSTRACT

Many applications from geomechanics, aerodynamics and biomedical engineering require the accurate and stable simulation of complex multiphysics processes. Examples include fluid–structure interaction models (e.g., valvular modeling), fluid–porous or poroelastic medium interaction models (e.g, groundwater flow, fracture propagation), as well as the transport problems (e.g., transport of drugs or chemicals). The numerical simulation of coupled problems has received considerable attention in recent years, but still remains a significant challenge in the mathematical and computational sciences. Substantial effort is allocated to the design of adaptable and robust numerical methods for coupled problems due to their intricate multiphysics nature and often strong nonlinearity.

This minisymposium focuses on the mathematical models, numerical methods, and computational techniques used for solving coupled problems in various applications. Possible topics include but are not limited to:

- Fluid-structure interaction;
- Porous and poroelastic medium flow;
- Partitioned and monolithic methods for coupled problems;
- Validation and verification of numerical solvers;
- Higher-order partitioned methods for coupled problems.