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DOMAIN DECOMPOSITION AND TIME-SPLITTING METHODS FOR MULTISCALE MULTIPHYSICS PROBLEMS

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ABSTRACT

Multiscale multiphysics problems are ubiquitous in various science and engineering applications such as hydrology, environmental sciences, petroleum engineering, and biomedical engineering. Mathematical modeling and numerical simulations for these problems are of great importance and have attracted much attention of mathematicians and computational scientists to develop advanced numerical methods capable of efficiently and accurately capturing the different physical processes and the wide range of scales in both space and time inherent in the simulations. The goal of this minisymposium is to present recent progress in the development of decoupling algorithms with such features, such as domain decomposition and time-splitting methods, for flow and transport in (fractured) porous media, surface-subsurface flow coupling, fluid-structure interaction, fluid-poroelastic structure interaction, and related models. Topics of interest include, but are not limited to, stability and accuracy of the numerical solutions, convergence and preconditioning of the iterative algorithms, a posteriori error estimation, and adaptivity.