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OPTIMIZATION METHODS FOR COUPLED PROBLEMS

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ABSTRACT

The application of complex optimization techniques allows researchers to affect key quantities of a system at their favor, going beyond pure prediction of system behavior. This minisymposium gives a platform to recent developments in the field of optimization of coupled problems, which arise in large variety. It is open to all solution techniques, ranging from monolithic to partitioned and one-way to two-way coupling, employing first or second order optimization methods, using matching or non-matching discretizations, and including solution schemes adapted to the considered applications, e.g., by multi-rate time-stepping techniques or frozen state variables.

Optimization in these settings is challenging and requires efficient solvers for the coupled problems. Reducing computational runtime can, e.g., be achieved by introducing effective reduced order models or black-box solvers that can efficiently be evaluated. The applicability of gradient based optimization methods using these surrogates is directly connected to the availability and computability of derivatives. This is especially demanding in cases where adjoint techniques are not applicable in the usual way.

We invite researchers with an engineering or mathematical background who develop novel techniques and methods for optimization and control of coupled problems.