Schwarz-in-time methods for parabolic optimal control problems.

Kwok Félix*
University of Laval, Canada
felix.kwok@mat.ulaval.ca

Abstract

Discretized parabolic control problems lead to very large systems of equations, because trajectories must be approximated forward and backward in time. In this talk, we show how to use domain decomposition in time to solve such problems: by subdividing the time horizon into overlapping or non-overlapping subintervals, we obtain smaller optimization problems that can be solved independently. To ensure continuity of the solution across subintervals, we use a fixed point iteration on the interface conditions, which can be either of the classical (Dirichlet) or optimized (Robin) type. We analyze the convergence of this fixed point iteration in two different ways, first using a spectral analysis that is valid for self-adjoint spatial operators, and then using an energy estimate technique that is valid for more general operators. Finally, we show how to choose the Robin parameters to optimize the convergence factor for our method.