Efficient Solution of A Nonlocal Optimal Control Problem

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We consider the optimal control of a Kirchhoff-type problem, which is governed by a partial differential equation with a nonlocal term. Consequently, the linear systems arising in the solution of the forward problem and also the optimality system associated with an optimal control problem, contain dense blocks. We discuss a preconditioning strategy for iterative solvers and a matrix-free implementation, which significantly cuts down on the computational cost. Analysis and numerical results are presented.

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