

Some notes and questions about preconditioning concerning optimal control of parabolic equations

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Motivated by problems arising in optimal control of anisotropic Allen-Cahn equations we analyse first the simplification to linear parabolic equations. In particular we study problems where the target function is given at the final time T only. For the reduced problem formulation we provide eigenvalue estimates which depend on T and on constants involved in the pde. However the estimates are independent of the discretization level. We also present a preconditioner for the optimality system of the unreduced system which has a highly singular 1-1 block. This approach is based on the work by Greif and Schötzau. When nonlinear terms are present in the pdes the arising linear systems change in each iteration. We shortly formulate the systems, state (for the author) open problems and wish for ideas or solutions from the audience.

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