

Mathematical Optimization Methods for the Remediation of Ground Water Contaminations

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Abstract This work is concerned with the numerical solution of optimization problems that arise in the context of ground water modeling. Both ground water hydraulic and quality management problems are considered. The considered problems are discretized problems of optimal control that are governed by discretized partial differential equations.

Aspects of special interest in this work are inaccurate function evaluations and the ensuing numerical treatment within an optimization algorithm. Methods for noisy functions are appropriate for the considered practical application. Also, block preconditioners are constructed and analyzed that exploit the structure of the underlying linear system. Specifically, KKT systems are considered, and the preconditioners are tested for use within Krylov subspace methods.

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