

GROUNDWATER MANAGEMENT MODELS: BALANCING MODEL SOPHISTICATION WITH PRACTICAL APPLICATION

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Groundwater management models combine simulation with optimization methods to address problems in groundwater management. The literature on groundwater management spans some five decades and includes innovations in problem formulation, advances in optimization algorithms and application to problems simulated with multi-process models. Three threads of this research will be considered in this talk: 1) coupling optimization with increasingly complex transport simulators, 2) development and application of evolutionary optimization algorithms, and 3) application of groundwater management models to field-scale problems. In the first thread, it is observed that it may not be possible to solve some of these problems at practical scales. In the second thread, it is noted that these algorithms have not been adequately tested on large scale problems. Finally, in the third thread, it is claimed that large scale problems are typically the only problems in which optimization may be useful. One of the first published field-scale applications was that by Ahlfeld, Pinder and Page (1995). The authors design a remediation well field using groundwater flow simulation and a hydraulic control formulation. Other flow-based management applications have appeared in subsequent years. But much additional research is needed to insure that successful application becomes routine practice.