

VARIATIONAL METHODS FOR INVERSE PROBLEMS

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Inverse problems involving the recovery of coefficient functions in partial differential equations from measurements involving the solutions, are in general computationally difficult, verging on intractable. We consider recovery methods based upon the minimization of certain functionals with unique global minima and unique stationary points. Applications include the electrical tomography problem, i.e. the recovery of electrical conductivity from Dirichlet-Neumann map data, and the full groundwater modelling problem. The use of critical point theory in establishing uniqueness will also be discussed.