MS12: Inverse Problems II

The Inverse Oilfield Problem

Ian Knowles, *University of Alabama at Birmingham*

Secondary oil recovery involves pumping fluids into injection wells to force oil towards the production wells. Effective recovery strategies require a knowledge of subsurface properties, such as permeability, throughout the oilfield. We introduce a new variational method for the determination of subsurface parameters from well data. This is joint work with my UAB graduate student Fatin Alawam.

Global Uniqueness and Stability of an Inverse Problem for the Schrödinger Equation on a Riemannian Manifold via One Localized Boundary Measurement

Roberto Triggiani, *University of Memphis*

We consider a mixed problem for the Schrodinger equation on a nite dimen- sional Riemannian manifold with magnetic and electric potential coecients. the goal is a nonlinear problem of the recovery of the electric potential coecient by means of only one boundary measurement on an explicitly identied portion of the boundary and over an arbitrarily short time interval.We obtain global uniqueness of the recovery and Lipschitz stability of the recovery. Two key ingredients: Car- leman estimates and optimal interior and boundary regularity. Joint work with Zhifei Zhang

Control and Invrse Problems for a String

Sergey Avdonin, *University of Alaska, Fairbanks*

We consider boundary control and inverse problems for a nonhomogeneous string with masses attached at interior points. We prove exact controllability of the string in a sharp time interval with respect to a Sobolev space with the regularity exponent increasing at each 'mass' point. We demonstrate that the density of the string, masses and their coordinates can be recovered using the dynamical Dirichlet-to-Neumann map associated with a boundary point of the string.