Variational methods for inverse problems

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Abstract

An inverse problem for a differential equation involves finding one or more of the coefficient functions when one has some knowledge of the solution. These problems arise naturally from areas such as non-invasive imaging, both in industry and medicine, landmine detection, earthquake prediction, and in groundwater and oil reservoir modelling, for example. In this talk I’ll show how the Dirichlet principle, which asserts that certain differential equations can be solved variationally, can be adapted to determine a variational solution for these inverse problems.