



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

M. E. Taylor Analysis and PDE Seminar

Wednesday, September 4th
3:30 - 4:30 p.m.
Phillips Hall 385

Reconstruction of Small and Extended Regions in EIT with a Robin Transmission Condition

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Abstract. In this talk, we will discuss some applications of the Regularized Factorization Method (RegFM) to a problem coming from Electrical Impedance Tomography (EIT) with a first-order Robin transmission condition. This method falls under the category of qualitative methods for inverse problems. Qualitative Methods are used in non-destructive testing where physical measurements on the surface or exterior of an object are used to infer the interior structure. In general, qualitative methods require little a priori knowledge of the interior structure or physical parameters. We assume that the Dirichlet-to-Neumann (DtN) mapping is given on the exterior boundary from an imposed voltage. Full knowledge of this DtN mapping allows us to reconstruct extended regions. We also discuss the asymptotic analysis of an integral equation involving the DtN mapping and apply a Multiple Signal Classification (MUSIC)-type algorithm to recover regions of small volume. We also consider the problem where we have a second-order Robin condition. For this problem, RegFM will be used to recover extended regions for the separate cases where the boundary parameters are complex-valued and real-valued. Numerical examples will be presented for all cases in two dimensions in the unit circle.