

Stability for nonlinear inverse problems with low dimensional priors

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In this talk I will review some stability properties of a large class of inverse problems in infinite dimensional (Banach) spaces, especially nonlinear and ill-posed (e.g. electrical impedance tomography). The main focus will be on how to improve stability by imposing low dimensional priors on the unknown, in a deterministic setting, using functional analytic techniques. The low dimensional priors considered will be mainly finite dimensional linear subspaces and finite dimensional manifolds. These results can be combined with manifold learning techniques (in particular based on generative models) to learn a low dimensional parameterization of the unknown, which yields again stability under suitable conditions. This is based on a series of works done in collaboration with G.S. Alberti (University of Genoa), A. Arroyo (Complutense Madrid), J. Hertrich (TU Berlin), S. Sciotto (University of Genoa).