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Iterative Regularization of Nonlinear Inverse Problems for Partial Differential Equations

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We start with an overview of application fields where inverse problems appear and illustrate their ill-posedness and regularization methods for their stable solution first for linear problems. The main part of the talk is concerned with the functional analytic theory of iterative regularization methods for solving nonlinear inverse problems like parameter identification in pds or inverse scattering. The emphasis is on obtaining results about (optimal) convergence rates for such methods in the presence of data noise. We illustrate the results by numerical examples from various applications including the identification of doping profiles in semiconductor models.