

A numerical scheme for severely ill-posed nonlinear inverse problems with a regularized Moore-Penrose pseudoinverse

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Inverse problems appearing in optical tomography are nonlinear and severely ill-posed. Among non-iterative schemes, the Born and Rytov approximations are well known. These approximations, however, require linearization of the nonlinear inverse problem. Then the linearized inverse problem can be solved using the Moore-Penrose pseudoinverse with a suitable regularization. In this talk, I will take the nonlinearity of the inverse problem into account by considering the inversion of the Born and Rytov series. Since the Rytov approximation is more practical and has been used for experiment and clinical research, in particular I will explore nonlinear Rytov approximations by constructing the inverse Rytov series.