Solving nonlinear inverse problems by sequential subspace optimization with an application to terahertz tomography

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Abstract. *Sequential Subspace Optimization (SESOP) is an iterative regularization technique for efficiently solving inverse, ill-posed problems. So far it has been developed for linear inverse problems in Hilbert and Banach spaces. The key idea is to use not only one search direction (as in Landweber-type iterations), but multiple search directions to reduce the computation time. In this talk we want to introduce an adaption of this method to nonlinear inverse problems. To this end, we iteratively project the initial value onto stripes whose width is determined by the search direction, the nonlinearity of the operator and the noise level. We discuss convergence and regulariza- tion properties of our method and present a fast algorithm that uses two search directions. The talk concludes with numerical experiments in tera- hertz tomography.*