

## Abstract

The purpose of this thesis is to study how to overcome difficulties one typically encounters when solving non-negative inverse problems by standard Krylov subspace methods. We first give a theoretical background to the non-negative inverse problems. Then we concentrate on selected modifications of Krylov subspace methods known to improve the solution significantly. We describe their properties, provide their implementation and propose an improvement for one of them. After that, numerical experiments are presented giving a comparison of the methods and analyzing the influence of the present parameters on the behavior of the solvers. It is clearly demonstrated, that the methods imposing nonnegativity perform better than the unconstrained methods. Moreover, our improvement leads in some cases to a certain reduction of the number of iterations and consequently to savings of the computational time while preserving a good quality of the approximation.