LINEAR AND NONLINEAR INVERSE PROBLEMS AND THEIR APPLICATIONS

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ABSTRACT

Inverse problems, both linear and nonlinear, arise in many scientific fields such as image processing, X-ray tomography, geophysics, and machine learning. Often, this kind of problems stem from the discretization of continuous problems such as the solution of integral equations or the identification of parameters in differential equations. The main difficulties in solving inverse problems are that, on one hand, the existence and the uniqueness of the solution are not guaranteed; on the other hand, the solution does not depend continuously on the data leading to large errors in the solution.

Developing efficient and accurate numerical and computational techniques for solving inverse problems requires advancements in numerical linear algebra, approximation theory, optimization strategies, regularization, etc. For this reason, interest in exploring such techniques has grown significantly in the last years, increasing the need to create new high-performing approximation methods that are computationally efficient, easy to implement, and able to capture the particular features of the problem.

This minisymposia focuses on new trends in these fields, showing novel numerical approaches needed to achieve accurate solutions for inverse problems. Bringing together experts and early-career researchers aims to promote the exchange of innovative ideas and inspire new developments to address challenges posed by applied sciences.