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Operator-splitting algorithms for inverse and optimization problems for systems modeled by reaction-diffusion equations.

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Reaction-diffusion type PDEs have wide application in industry, science, and medicine. Although, there is extensive work in the derivation of appropriate models (reaction terms) and the development of numerical methods for the forward problem, there is little work on using optimization methods in order to facilitate parameter estimation, and control.

In this talk we will review the formulation and algorithmic treatment of inverse problems for parameter estimation by sparse observations. State-of-the-art algorithms for reaction diffusion equations are based on fully implicit and operator-splitting methods. We discuss how these methods can be used in optimization algorithms and we compare different solution strategies.

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