University of Chicago Computational and Applied Math Student Seminar Fall 2022

Iterative Ensemble Kalman Methods for Inverse Problems

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Abstract

Iterative ensemble Kalman methods are a family of highly parallelizable, derivative-free algorithms for numerically solving inverse problems. These algorithms can be derived from the perspective of data assimilation, where the inverse problem of interest is embedded in the observation operator. Alternatively, iterative ensemble Kalman methods can be interpreted as optimization algorithms where derivatives are approximated by the ensemble. In this talk, I will introduce the algorithms from both these perspectives, give an overview of the current theory describing these algorithms, and discuss some of the theoretical and computational challenges that remain as future research directions in this area.