EKI WITH DROPOUT

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Ensemble Kalman inversion (EKI) is an ensemble-based method to solve inverse problems. However, EKI can face difficulties when dealing with high-dimensional problems using a fixed-size ensemble, due to its subspace property where the ensemble always lives in the subspace spanned by the initial ensemble. To address this issue, we propose a novel approach using dropout regularization to mitigate the subspace problem. Compared to the conventional localization approach, dropout preserves the affine invariant property and avoids complex designing in the localization process. We prove that EKI with dropout converges with small ensemble settings, and the complexity of the algorithm scales linearly with dimension. Numerical examples demonstrate the effectiveness of our approach.

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