

Deeply learned regularization for limited angle computed tomography

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Abstract: In recent years, limited angle CT has become a challenging testing ground for several theoretical and numerical studies, where both variational regularization and data-driven techniques have been investigated extensively. In this talk, I will present hybrid reconstruction frameworks that combine model-based regularization with data-driven deep learning by relying on the interplay between sparse regularization theory, harmonic analysis and microlocal analysis. The underlying idea is to only learn the part that can provably not be handled by model-based methods, while applying the theoretically controllable sparse regularization technique to the remaining parts.

The numerical results show that these approaches significantly surpasses both pure model- and more data-based reconstruction methods.