

Inverse problems with Radon measures

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In this talk, regularization of ill-posed inverse problems involving Radon measures is studied. The main motivation is to find a sparse reconstruction for an unknown Radon measure based on indirect measurements. Similar questions has been previously examined in [3]. In this talk, it is shown that the minimization of the Tikhonov functional with the total variation norm penalty is a well-posed problem for Radon measures. A minimizer of the Tikhonov functional is characterized by using the corresponding Fenchel preidual problem. Convergence and convergence rate properties of minimizers are examined under common source conditions, like in [1, 2]. A numerical algorithm promoting sparsity is proposed.

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References

- [1] M. Burger and S. Osher. Convergence rates of convex variational regularization. *Inverse Problems*, 20(5):1411–1421, 2004.
- [2] B. Hofmann, B. Kaltenbacher, C. Poeschl, and O. Scherzer. A convergence rates result for Tikhonov regularization in Banach spaces with non-smooth operators. *Inverse Problems*, 23(3):987–1010, 2007.
- [3] O. Scherzer and B. Walch. Sparsity regularization for Radon measures. In X.-C. Tai, K. Morken, M. Lysaker, and K.-A. Lie, editors, *Scale Space and Variational Methods in Computer Vision*, volume 5567 of *Lecture Notes in Computer Science*, pages 452–463. Springer-Verlag, 2009. Proceedings of the Second International Conference, SSVM 2009.