Structural and Numerical Aspects of TV-minimization.

In this talk, we will discuss several aspects of problems of the type

$$\min_{u \in \mathcal{B}} \|Lu\|_{TV} + f_b(Au).$$

Here, $\mathcal{B}$ is a Banach space, $\|\cdot\|_{TV}$ is the total variation of a measure, $L : \mathcal{B} \to \mathcal{M}(\Omega)$ is a continuous operator from $\mathcal{B}$ to the space of Radon measures of finite total variation $\mathcal{M}(\Omega)$, Ω is a locally compact and separable metric space, $A : \mathcal{B} \to \mathbb{R}^m$ is a measurement operator and $f_b : \mathbb{R}^m \to \mathbb{R}$ is a function.

We will discussion conditions on L, A and f_b which guarantee that problems of the above form have solutions u_* which are sparse in a certain sense. Furthermore, we will describe strategies to numerically resolve them. This analysis will in particular reveal new perspectives on discretization of the above problem.

This talk is based on joint work with Pierre Weiss.