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Exact recovery of the support of piecewise constant images via total variation regularization

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In this talk, I will consider the reconstruction of some unknown image from noisy linear measurements using total (gradient) variation regularization. Empirical evidence and theoretical results suggest that this method is particularly well suited to recover piecewise constant images. It is therefore natural to investigate how it performs when the unknown image has precisely this structure. I will present a noise robustness result stating that, in a low noise regime, the reconstruction is also piecewise constant, and one exactly recovers the number of shapes in the unknown image. This is a joint work with Yohann De Castro and Vincent Duval.

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