



# Multiscale Methods for Shape Constraints in Deconvolution

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We derive multiscale statistics for deconvolution in order to detect qualitative features of the unknown density. An important example covered within this framework is to test for local monotonicity on all scales simultaneously. The errors in the deconvolution model are restricted to a certain class of distributions that include Laplace, Gamma and Exponential random variables. Our approach relies on inversion formulas for deconvolution operators. For multiscale testing, we consider a calibration, motivated by the modulus of continuity of Brownian motion. We investigate the performance of our results from both the theoretical and simulation based point of view. A major consequence of our work is that the detection of qualitative features of a density in a deconvolution problem is a doable task although the minimax rates for pointwise estimation are very slow.

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