



# Multiscale Methods for Shape Constraints in Deconvolution: Confidence Statements for Qualitative Features

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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. We investigate the moderately ill-posed setting, where the Fourier transform of the error density in the deconvolution model is of polynomial decay. 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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