

A Multiple Testing Approach to Wavelet Thresholding

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Abstract: Following Abramovich and Benjamini (1996), we argue that wavelet thresholding can be seen as a multiple testing situation, in which a simple null hypothesis is tested on each coefficient. We propose new procedures to perform corrections in multiple testing, tailored to the thresholding situation (very large number of tests, very small number of false nulls, strong signal). Dependence between the coefficients, namely association and negative association, is dealt with. With simple extensions of the results of Vannucci and Corradi (1999), we make some general statements on the dependence between the wavelet coefficients. Comparison with classical methods is done by means of the usual test functions, and an example of image reconstruction. It is seen that the multiple testing approach to wavelet thresholding achieves lower mean square errors in cases in which the signal-to-noise ratio is not low.

Keywords: Wavelet Thresholding, Multiple Hypotheses Testing, False Discovery Rate, Image Reconstruction

References

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