Multiscale iterative methods for decomposition, deblurring and denoising of images

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Abstract: The multiscale hierarchical decomposition method (MHDM) introduced by Tadmor, Nezzar, Vese (2004, 2008) deals with the restoration of noisy or blurred images that have features at different scales, enabling fine decompositions by updating appropriate parameters.

We show theoretical and numerical results of the MHDM and of several extensions in the classical additive noise setting. Moreover, we adapt the MHDM to deal with images perturbed by multiplicative noise, and present comprehensive numerical experiments and comparisons.

This is joint work with Joel Barnett, Wen Li and Luminita Vese.