Supporting Material for:
Wavelet Shrinkage with Consistent Cycle Spinning Generalizes Total Variation Denoising

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Abstract

In this document, we present additional simulations supporting the results of the paper Wavelet Shrinkage with Consistent Cycle Spinning Generalizes Total Variation Denoising submitted to IEEE Signal Processing Letters. Throughout this document, we refer to the method proposed in the main paper as consistent cycle spinning (CCS).

Additional Experimental Results

In Section IV-B of the main paper, we compare the SNR performance of log-regularized and total variation (TV) denoising. All the results in Figure 2 of the paper were obtained by running CCS. Here, for the same experiment, we compare the performance of CCS with FISTA [8] for TV regularization.

Figure 1(a) and (b) illustrate the evolution of the TV objective function and SNR over 50 iterations, respectively. Figure 1(c) shows the TV objective function over 5 seconds of CPU time. It can be seen from the figure that the performance of CCS is comparable to that of FISTA; however, the advantage of CCS is that it can readily handle arbitrary potential functions (e.g. log-regularizer).

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Figure 1: Image denoising with TV regularization with FISTA (dashed-red) and CCS (solid-blue). (a) Evolution of the objective function over iterations. (b) Evolution of the SNR over iterations. (c) Evolution of the objective function over CPU time.