

ℓ^1 -MINIMIZATION OF ANALYSIS COEFFICIENTS

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ℓ^1 -minimization, namely solving an underdetermined linear equation system $y = Ax$ via

$$\min \|z\|_1 \text{ subject to } y = Az$$

is the number one tool in Compressive Sensing and has given rise to plethora of related algorithms, most notably TV-minimization. Many variants also aim at minimizing the image of the object in question under some sparsifying transform, e.g. the Wavelet transform. We are going to show that minimizing the analysis coefficients of any given frame representation, regardless of the frame being tight or anything else, yields proper reconstruction provided the analysis coefficients of original x were sparse.

Moreover, this is extended to the reconstruction of functions from a finite number of samples via the minimization of the function's *Shearlet*-coefficients.