Regularization

Regularize version of Lasso and basis-pursuit denoise can be obtained by augmenting A with the weighted identity matrix, and augmenting b with a vector of all zero. For convenience, SPGL1 also supports direct regularization, which changes the Lasso formulation to

$$\underset{x}{\text{minimize}} \quad \tfrac{1}{2}\|Ax-b\|_2^2 + \tfrac{\mu}{2}\|x\|_2^2 \quad \text{subject to} \quad \|x\|_p \leq \tau$$

and basis-pursuit denoise to

$$\underset{x}{\text{minimize}} \quad \|x\|_p \quad \text{subject to} \quad \left\| \begin{bmatrix} A \\ \sqrt{\mu} I \end{bmatrix} x - \begin{bmatrix} b \\ 0 \end{bmatrix} \right\|_2 \leq \sigma.$$

The μ parameter can be specified in the options as `options.mu` or as parameter `mu`.