Software to find sparse approximate solutions to linear equations.

Programs

sparseLS_GMC
    Sparse-regularized least squares using the GMC penalty.
    Algorithm: saddle-point formulation.

sparseLS_GMC_ver2
    sparseLS_GMC using minimization formulation (instead of saddle-point formulation).

sparseLS_L1
    Sparse-regularized least squares using the L1 norm

demo_FFT
    Example from paper: signal denoising using frequency-domain sparsity

demo_bat
    Example from paper: signal denoising using STFT sparsity

huber function plots -
    plotting Huber function in 1D and 2D

huber_1d_demo
    Shows the one-dimensional Huber function and MC penalty

huber_2d_demo
    Shows the generalized Huber function and generalized MC penalty in two-dimensions

huber_2d
    Calculates two-dimensional generalized Huber function

Reference:
I. Selesnick, 'Sparse Regularization via Convex Analysis'
IEEE Transactions on Signal Processing, 2017.

A classical method for sparse least-squares is L1-norm regularization, but this often underestimates the amplitudes of the true solution values. As an alternative to the L1 norm, this software uses the generalized minimax-concave (GMC) penalty which maintains the convexity of the least squares cost function to be minimized. This software minimizes the GMC sparse-regularized least squares cost function using a proximal algorithm comprising simple computations.

Change log

Revised March, 2022
- add sparseLS_GMC_ver2

Revised March, 2022
- move functions to plot Huber functions into separate folder
- changed names of programs for L1 and GMC least-square solvers

March 18, 2017
- first version, released at time of paper.

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