Matlab code for BLO-OMP

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1 Spectral estimation

The package contains the codes of Orthogonal Matching Pursuit (OMP) and Band-excluded and Locally Optimized OMP (BLO-OMP) for the spectral estimation problem:

$$y_k = \sum_{j=1}^{s} x_j e^{-2\pi i k \omega_j} + e_k,$$

where $\omega_j \in [0,1), x_j \in \mathbb{C}, k = -f_c, \ldots, f_c$ and $e \sim N(0, \sigma^2 I) + iN(0, \sigma^2 I)$.

2 Functions

1. **Main:** the main function where frequencies and measurements are generated.
2. **OMP:** the code of realizing OMP [2].
3. **BLOOMP:** the code of realizing BLO-OMP [1].
4. **H_dist:** the code of computing the Hausdorff distance between two frequency support set. For example, let $\mathcal{S} = \{\omega_j\}$ and $\hat{\mathcal{S}} = \{\hat{\omega}_j\}$. The Hausdorff distance between $\mathcal{S}$ and $\hat{\mathcal{S}}$ is

$$d(\hat{\mathcal{S}}, \mathcal{S}) = \max\left\{ \max_{\hat{\omega}\in\hat{\mathcal{S}}} \min_{\omega\in\mathcal{S}} d(\hat{\omega}, \omega) \ , \ \max_{\omega\in\mathcal{S}} \min_{\hat{\omega}\in\hat{\mathcal{S}}} d(\hat{\omega}, \omega) \right\}.$$

   where $d(\omega, \hat{\omega})$ is the distance between ω and $\hat{\omega}$ on Torus.

References

[1] A. Fannjiang, and W. Liao, "Coherence pattern-guided compressive sensing with unresolved grids," *SIAM Journal on Imaging Sciences* **5(1)** pp.179-202, 2012.

[2] Y. C. Pati, R. Rezaiifar and P. S. Krishnaprasad, "Orthogonal matching pursuit: Recursive function approximation with applications to wavelet decomposition," *The Twenty-Seventh Asilomar Conference on Signals, Systems and Computers, IEEE,* 1993.