SparsePR: Matlab Software for Sparse Phase Retrieval

This repository contains Matlab code for solving the sparse phase retrieval problem. Details of the method, theoretical guarantees and representative numerical results can be found in

Robust Sparse Phase Retrieval Made Easy
Mark Iwen, Aditya Viswanthan and Yang Wang
arXiv
2014

This software was developed at the Department of Mathematics, Michigan State University and is released under the MIT license.

The software was developed and tested using Matlab R2014a and uses TFOCS, a Matlab software package for the efficient construction and solution of convex optimization problems. A copy of the TFOCS package is included under the third party software directory at third/. A selection of scripts also uses the CVX optimization software, which can be downloaded here.

Directory Structure and Contents

The software package is organized under the following directory structure:

- demos/
  This folder contains a representative implementation of the algorithm discussed in the paper. It also contains implementations of related algorithms, such as Basis Pursuit Compressive Sensing reconstruction, PhaseLift and Compressive Phase Retrieval via Lifting (CPRL). If you have just downloaded the software, execute sparsePR.m from this folder in Matlab.
- src/ This folder contains auxiliary functions necessary to implement the algorithm. Examples include generating test functions and measurements.
- tests/ This folder contains convergence tests; for example, scripts to generate noise vs error plots, runtime plots and so on. These typically take a long time to run and are provided for those looking to recreate the results in the paper.
- third/ This software contains third party software used by SparsePR. In particular, it contains an installation of TFOCS with minor modifications (to the tfocs_initialize.m routine).
- contrib/ This folder will contain contributed code and additional examples, modifications and applications.

Instructions

Extract the contents of the zip file and execute, in Matlab, scripts from the demos/ and tests/ folder. Scripts which use CVX have _cvx.m in their file name. These require a working installation of CVX.

Contact

Bug reports, comments and suggestions are welcome at the SparsePR Bitbucket repository.