

# Read me file for SAR Imaging codes in MATLAB

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## Abstract

In this package are a few demos and additional codes for image reconstruction problems in synthetic aperture radar (SAR).

In order to run all of these codes one needs:

- to download and set up Fessler's code for the NUFFT [3]:  
<https://web.eecs.umich.edu/~fessler/code/index.html>
- to download and set up my own imaging software [4]:  
<https://www.toby-sanders.com/software>
- to download some data corresponding to each demo [2, 1]

Additional details on this work is provided in [6, 5].

## References

- [1] Curtis H Casteel, LeRoy A Gorham, Michael J Minardi, Steven M Scarborough, Kiranmai D Naidu, and Uttam K Majumder. A challenge problem for 2d/3d imaging of targets from a volumetric data set in an urban environment. 6568:65680D, 2007.
- [2] Kerry E Dungan, Christian Austin, John Nehrbass, and Lee C Potter. Civilian vehicle radar data domes. *Algorithms for synthetic aperture radar Imagery XVII*, 7699(1), 2010.
- [3] J.A. Fessler and B.P. Sutton. Nonuniform fast Fourier transforms using min-max interpolation. *IEEE Transactions on Signal Processing*, 51(2):560–574, 2003.
- [4] T. Sanders. Matlab imaging algorithms: Image reconstruction, restoration, and alignment, with a focus in tomography. <http://www.toby-sanders.com/software>, <https://doi.org/10.13140/RG.2.2.33492.60801>. Accessed: 2016-19-08.
- [5] Toby Sanders, Christian Dwyer, and Rodrigo B Platte. Fourier analysis, computing, and image formation for synthetic aperture radar. *preprint*, 2018.
- [6] Toby Sanders, Anne Gelb, and Rodrigo B Platte. Composite sar imaging using sequential joint sparsity. *Journal of Computational Physics*, 338:357–370, 2017.

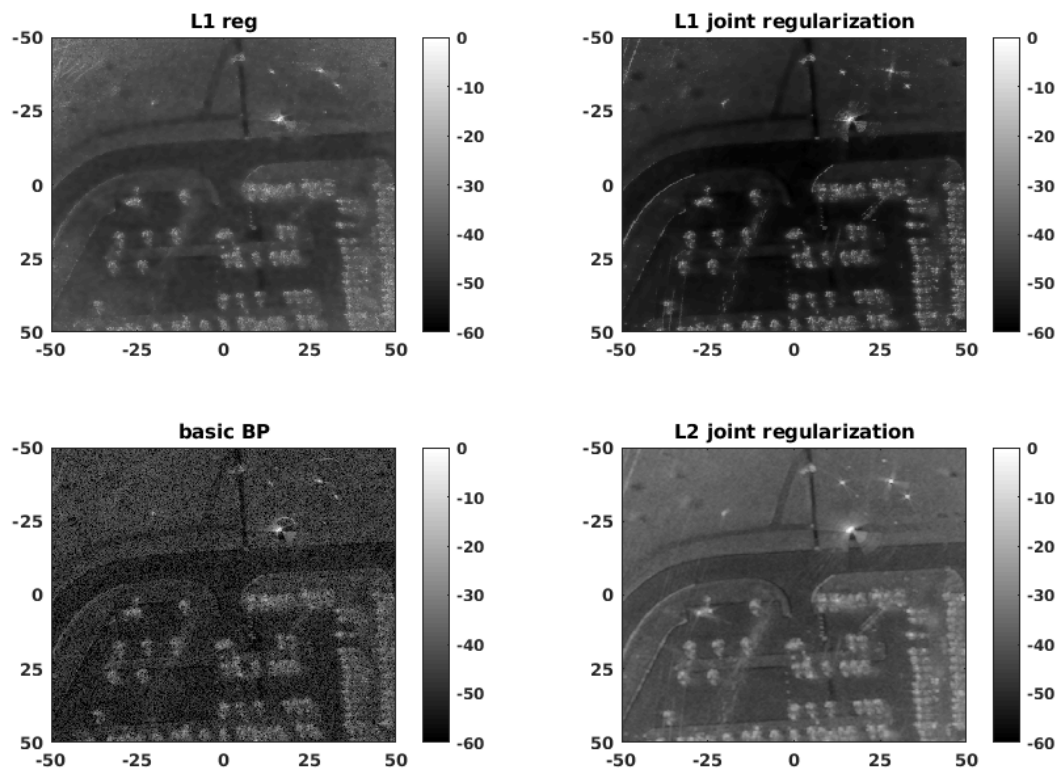


Figure 1: These are the results and figure produced by “demo\_gotcha.m”, with data from [1].

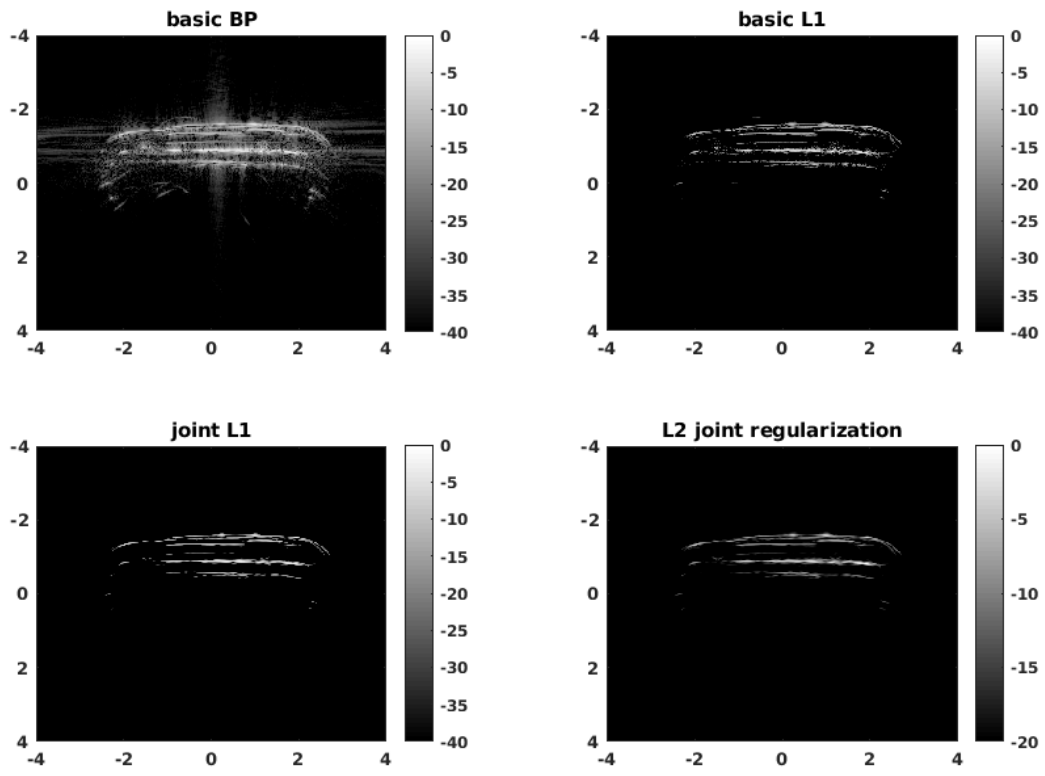


Figure 2: These are the results and figure produced by “demo\_CV.m”, with data from [2].

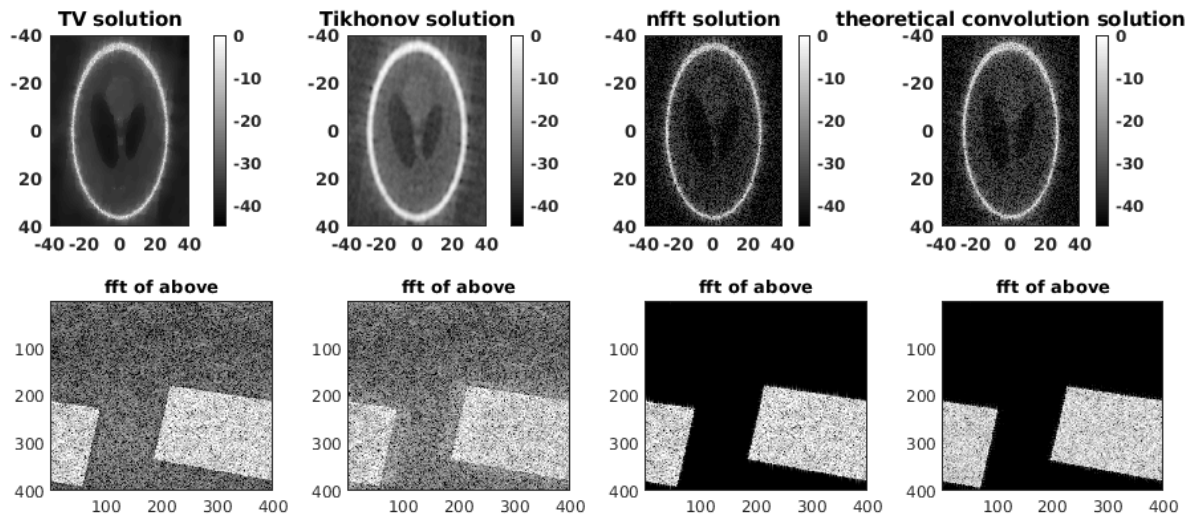


Figure 3: These are the results and figure produced by “demo\_shepp\_phantom.m”, with no data download necessary. Details provided in [5].