Tools for selective parity (aka selpar or sp) reconstruction

./data: the folder contains test data for recon: haste (DW-HASTE) and sp (SP-DW-HASTE). where *b* represents the strength of diffusion-weighting gradients: b0 (diffusion-weighting gradients set to 0) and b1000 (diffusion-weighting gradients along the phase encoding direction); and *R* represents the acceleration factor along phase encoding (PE) direction.

Folder “matlabStuff” contains all dependencies for selpar recon:

1. FID-A-master: scripts for reading Siemens raw “\*.dat” files.

Available from https://github.com/CIC-methods/FID-A

1. SPIRiT\_v0.3: scripts for estimating the non-acquired k-space lines with SPIRIT-cg (SPIRIT conjugate gradient).

Available from https://people.eecs.berkeley.edu/~mlustig/Software.html

An alternative is to use SPIRIT-POCS implemented in-house.

1. selpar\_recon: scripts for selpar recon.
2. NIfTI\_read\_write: scripts for reading/writing “\*.nii” files, used to generate bias field.

To start with selpar recon:

1. set\_paths.m

Please, check that all paths: (a) to FID-A-master, (b) to SPIRIT-cg, and (c) to NIfTI\_read\_write are set correctly. If they are, running this script will ensure that all tools for selpar recon are available.

1. Please, make sure that all raw “\*.dat” files are housed in separate sub-folders. Otherwise, during “\*.dat” to “data.mat” file conversion, “data.mat” files will be overwriting each other!
2. read\_raw\_data\_selpar\_tasker.mat

Running this script from the top directory will convert all sub-folders’ “\*.dat” files to “data.mat” files.

1. master\_script\_selpar\_recon.m

The master script for performing selpar recon (the recon itself is implemented in selpar\_recon.m). The interface of the master script is explained in the script header.

1. master\_script\_selpar\_recon\_tasker.m

The tasker will run all of the jobs sequentially. It also shows how to set up a recon job.

1. save\_sosimg\_tasker.m

Running this script from the top directory will convert all sub-folders’ “dataRecon.dat” files to “sosimg.mat” files, effectively performing sum-of-squares (SoS) recon.

1. plot\_montage.m

Will create a montage of SoS images and save them if necessary.

1. generate\_bias\_field.m

Script (unlike all others above, this one is operated manually) to generate bias field maps. The bias field maps should be generated only once for the given session per matrix size using the highest quality fully reconstructed data (SoS) available.

1. The bias field correction for now needs to be performed manually. I would recommend creating a brain mask and performing normalization only over the mask, i.e. image(brain mask > 0)./bias(brain mask > 0) and let the background (noise) through unchanged.