Manual

Before processing, you should have acquired two datasets, a CEST imaging dataset over a range of offsets, and a WASSR dataset over a range of offsets.

Examples are given by CESTdata.mat and wassr.mat, in which the 'w' is the vector of offsets and 'MI_rare' is a 3D matrix of CEST weighted images for all the offsets.

Step 1. Draw a ROI and threshold the images by SNR
matlab codes: *preprocessing.m*
example: preprocessing(filename of wassr data set, SNR threshold, number of ROI)

You may want to change the filenames specified to store SNR and ROI masks, e.g. ref_M0mask.mat for the SNR mask and ROImask.mat for the ROI mask

Step2. Estimating B0 inhomogeneity map using WASSR
matlab main function= B0Mapping.m
usage: B0mapping(wassrfilename, maskfilename, outputfilename, flag)
wassr data name, e.g. wassr.mat
threshold mask filename, e.g. ref_M0mask.mat
output filename of the produced B0 maps, e.g. B0map.mat
flag: 'spline' or 'Lorentzian'. The default is 'Lorentzian'.

Note that one of two possible B0 maps can be produced through either spline interpolation of the data or fitting this data to a Lorentzian lineshape. This step can take up to several minutes depending on hardware and method chosen.

Step3. CEST processing
matlab main function= *CEST_process.m*
other home-made functions inside this=
B0correction_Spline.m: Spline B0 correction with moving smooth factor of 0, 1, or 2
Cal_MTRasym.m: calculate and plot MTRasym map

There are also a few parameters which should be user defined:
mask name, e.g. ref_M0mask.mat and ROImask.mat
CEST data name: CESTdata.mat
B0 map data name: B0map.mat
cest_freq: the frequency of interest (CEST frequency) in ppm, at which the MTRasym map will be calculated.
wSp: the interpolation frequency range
FS: field strength
cnr_threshold: the value for thresholding MTRasym contrast maps according to the contrast-to-noise (CNR) of each pixel

The ROI mean of z spectra and MTRasym will be exported to excel files using Matlab function of *xlswrite*.

More information of data processing has been described in our previous publication: Liu G, Gilad AA, Bulte JWM, Van Zijl PCM, Mcmahon MT. High-throughput screening of chemical exchange saturation transfer MR contrast agents. Contrast Media Mol Imaging 2010;5(3):162-170.