This folder contains codes to perform source localization using two methods: (1) Using the LORETA software developed by Dr. Pascual-Marqui (<https://www.uzh.ch/keyinst/>), and (2) using fieldtrip.

1. Using the LORETA-KEY software

* runAnalyzeAndSavePowerValuesIndividualSubject.m – saves the PSD and alpha/gamma power data in a local folder called analyzedData. This allows us to select subjects who have alpha/gamma power exceeding some threshold.
* saveGoodProtFlag.m and goodProtFlag.mat – For each subject, 2-3 protocols are run. This program generates a mat file called goodProtFlag which contains indices of good protocols for each subject.
* Data is then saved in a format that can be read by the LORETA software. The output of the Software is then saved as .txt files.
* runSaveRawLORETAData.m and saveRawLORETAData.m – read the .txt output files from the LORETA software and save mean source power and also t-stats locally.
* getVoxelInfo.m and voxelInfo.xls – the output of LORETA gives sources at 6239 locations. These programs return the coordinates of these locations.
* runDisplayData, displayData and getLORETAData – displays change in power, topoplots, and source maps at different frequency bands.

1. Using fieldTrip
   * PrepareSourceModel – This script generates the data (headmodel, sourcemodel and leadfield) required to perform source analysis. This includes the following:

- MRI preprocessing

- Head model creation

- Source model generation

- Lead field computation

Optionally, if the display flag is on, you can view the model

* + prepareDataSourceLocalization – repairs bad channels, performs average reference, segments the data into pre ad post.
  + performSourceLocalization – takes data prepared by prepareDataSourceLocalization and performs source localization.
  + displaySourceData – displays the results of source localization.

Postprocessing

* + getPowerVsDistance – computes power as a function of distance from a seedvoxel and fits an exponential
  + source2sensor – given source data and a leadfield matrix, generates sensor data.

saveDataExampleSubject – saves intermediate data from one subject. This data is used to reconstruct sensor data from a few sources and then performing source analysis again.

displayResultsTruncatedSources – displays the results of source localization from the sensor data generated by the previous code.