R scripts to process Wii Balance Board data:

1. read\_balance\_board\_data\_files.R
   1. Base data processing script. This script assumes that, within the top-level directory (e.g. ‘/balance\_board/data/’), each subject has their own directory, within which all of that subject’s balance board data files are stored. There should be separate “Active” and “Calibration” files for each condition at each timepoint.
   2. This script calls two functions:
      1. do\_COP.R: Calculates the Center of Pressure
      2. calculate\_sway\_measures.R: Takes the COP time series output from do\_COP.R and calculates a number of postural sway measures. To know what these measures are, there is a paper cited at the top of this function that describes them and their calculation.
   3. Output files:
      1. A .csv file of the COP time series
      2. A .csv file of the sway measures

Doing Detrended Fluctuation Analysis (DFA)

There is one issue to consider with doing DFA analyses. The Wii balance board data is not sampled at a uniform sampling rate, i.e. there is not the same number of milliseconds between each data sample. To do DFA, the data needs to be uniformly sampled, so we must resample the COP time series data to a constant rate…in our case, to a 50 Hz sampling rate. Unfortunately, I have not found a way to resample non-uniformly sampled data in R (I plan to revisit this, though, when I get time). So, I have written a Matlab script to resample the COP time series. Let me know if you do not have access to Matlab.

Actually running the DFA analyses is done in R.

Matlab script to resample COP time series data:

1. resample\_COP\_timeseries\_data.m
   1. This script reads in the COP time series data files output by the R scripts, resamples it to a uniform 50 Hz, and saves the new resampled data in a .csv file.

R scripts for running DFA analyses:

1. read\_resampled\_data\_do\_DFA.R
   1. This script calls the function do\_DFA.R
   2. Output file: a .csv file with DFA estimates for all conditions for all visits for each subject