2nd homework, 09/29/2023 (The homework is due by Oct 12th, 11:55 pm).

This dataset includes eye blink, eye closed, eye open, and clenched teeth conditions.

1-

(a) Compute the power spectral density (PSD) of the entire eyes open and eyes closed conditions for channel "Oz". Plot the resulting PSD from 0-70 Hz (i.e., both eyes open and eyes closed conditions in one plot) in the same plot, with separate subplots for each subject. Be sure to use common axis limits with clear labels for each subject.

Hint: For PSD use the 256-pt pwelch Matlab function. For parameters, use 1-second windows with 50% overlap. All PSD plots should be in 10log10 scale.

(b) For only the eyes-closed condition, identify the peak alpha frequency (i.e., 8-12 Hz) over channel "Oz" for each subject and plot the topographies for the eyes open and eyes closed conditions. Use separate subplots and colorbars for each subject. Note: For the topographical maps, make the colormaps in 'jet' format. There is no need for keeping the color limit the same across subjects. However, it should be the same across conditions (e.g., eyes open vs. eyes closed)

(c) Repeat step (a) for the teeth clenched condition using channels "T7" and "T8". Plot the resulting PSD from these two channels in the same plot.

(d) Plot the teeth clenched topographies at 10, 25, 40, and 65 Hz for each subject following the same formatting instructions in step (b).

2- Design an automated eyeblink detector for channel Fz. Plot the signal from this channel (e.g., in blue) and your eyeblink detector's output in another color (e.g., red) in the same plot. Generate the same plot for all the subjects. Clearly describe the method, comments, and the observations in a detailed, typed document.