ASSIGNMENT 4 (due 09.11.2021)

1.FIGURE (1)
Select one electrode and compute the STFT (averaged across trials as in FIGURE 15.2) without baseline normalization. You are free to choose the window (hanning) length and time step you want. Plot in 3 panels the TF power (*hint: abs(ifft output)^2*), the time course at 10 Hz, the frequency spectrum at t = 100 ms.
2 points

2.FIGURE(2)
Select one electrode and one frequency and compute power over time (*hint: abs(convolution output)^2*) at that electrode and that frequency averaged across trials using complex wavelet convolution, filter-Hilbert, short-time FFT and multitaper (N tapers = 3). Plot the results of these three time-frequency decomposition methods in different subplots (time vs amplitude) of one figure.
You are free to choose:

- For the complex wavelet, the number of cycles you want
- For the Filters, the shape you want around the chosen frequency
- For the STFT, the window (hanning) length and time step you want

For the multitaper, please keep the same settings as for STFT.

Note that the scaling might be different because no baseline normalization has been applied. How visually similar are the results from these three methods? If the results from the four methods are different, how are they different, and what parameters do you think you could change in the four methods to make the results look more or less similar?
4 points

3. FIGURE(3)
Extend your analysis to the full range of frequencies and plot the time-frequency power averaged across trials using complex wavelet convolution, filter-Hilbert, short-time FFT and multitaper (N tapers = 3). Use dB normalization with baseline window [-500 -200] ms.

Are the results from the four methods different? how are they different, and which method is better for low frequency and high frequency estimation?
4 points

4. (OPTIONAL). Repeat 2 with a toolbox (Fieldtrip/MNE) functions. Do they look like the images you produced with your own code? What do you think is not reproducible?
5 points