Tampere University

BBT.HTI.501 Processing of Biosignals Assignment 1

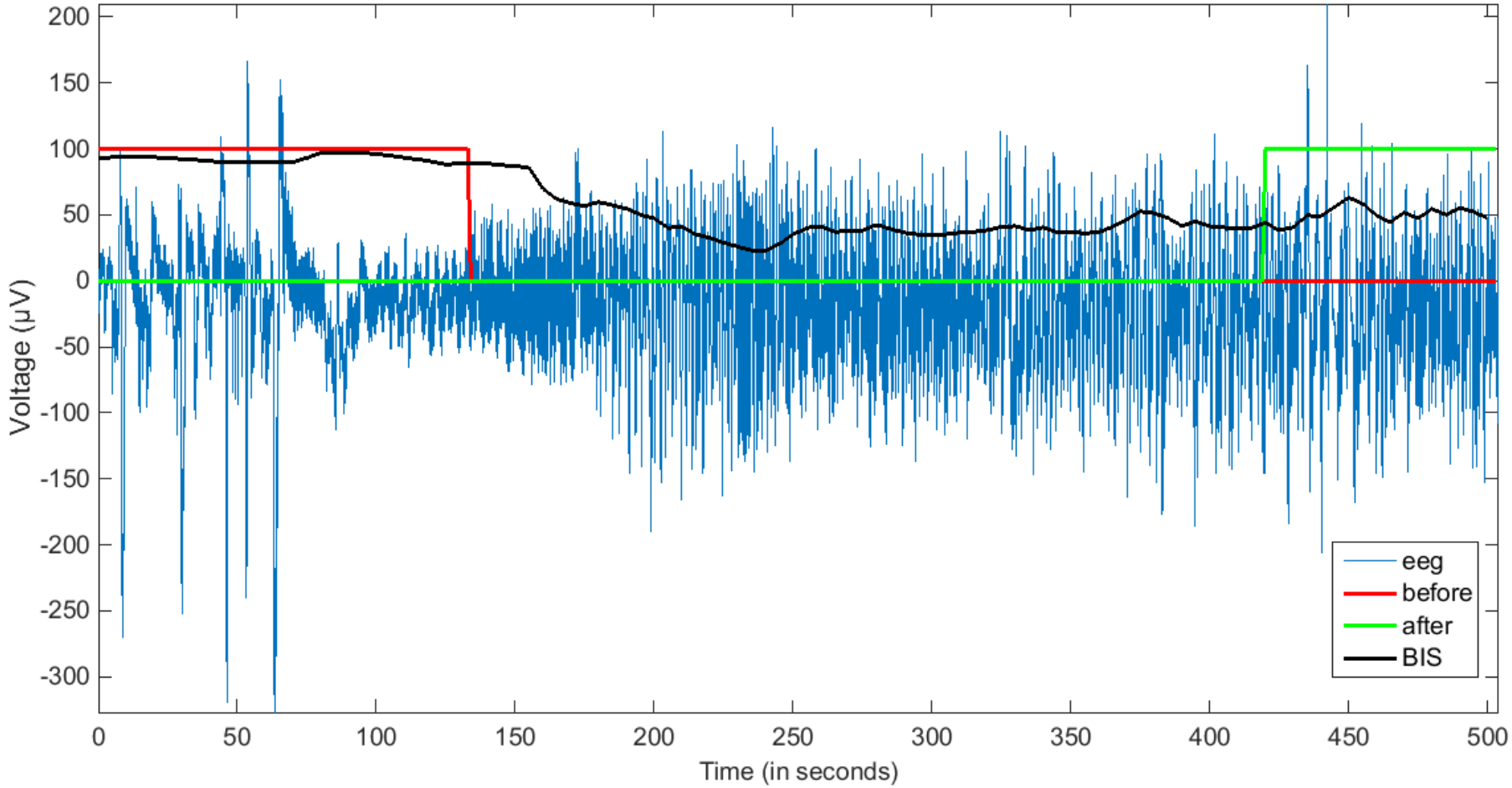
Milla Juutinen
milla.juutinen@tuni.fi

EEG & depth of anesthesia

- EEG is more regular i.e. less complex during anesthesia than during awake
- The complexity/regularity of a signal can be assessed with entropy
  - In frequency domain: spectral entropy

➢ The higher the spectral entropy of the EEG signal is, the more likely it is that the subject is awake

The data: EEG, anesthesia & BIS index



FIR & IIR filters

- FIR filter needs higher order to meet the given frequency response than an IIR filter
- FIR filters have more ripples* in the stop- and pass-bands than IIR filters
- FIR filters are always stable, whereas IIR filters are not

- *ripple = the fluctuation of voltage or current from the mean value

Useful MATLAB commands

- Plotting the figures:
  - `hold on, legend, plot, xlabel, ylabel`
- Filter design & filtering:
  - `Butter, filtfilt, fir1, freqz`
- Note: when you calculate the sampling frequency, remember to **round** the result!
- For FIR filter (fir1): a=1 (For IIR filter (butter) you need to calculate both b and a parameters) → Check help and mathworks
- Scaling factor (sf) == nfactor
- Use log10 (in MATLAB, log is the natural logarithm)