

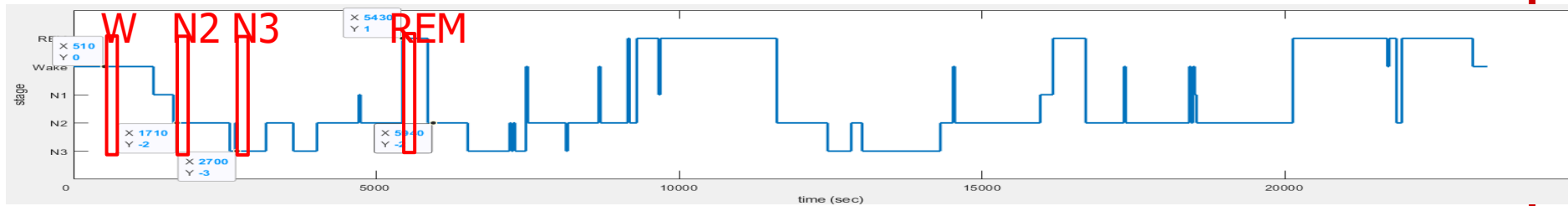
# HW #4

1. Implement the Pan-Tompkins method for QRS detection in MATLAB. You may employ a simple threshold-based method to detect QRS complexes as the procedure will be run off-line.

Apply the procedure to the signals in the files ECG3.dat, ECG4.dat, ECG5.dat, and ECG6.dat, sampled at a rate of 200 *Hz* (see the file ECGS.m). Compute the averaged heart rate and QRS width for each record. Verify your results by measuring the parameters visually from plots of the signals.

2. Redo problem 1 to three 5-min ECG signals: ECG\_Wake.mat (ECG\_Wake.csv), ECG\_N2.mat (ECG\_N2.csv), ECG\_N3.mat (ECG\_N3.csv), ECG\_REM.mat (ECG\_REM.csv). Data should be downsampled from 512 Hz to 200 Hz before P-T analysis.
3. Analyze the frequency response of the filters used in P-T method.

- Due date: 11/15 2023.



### Data information:

- Sampling rate : 512 sample per second
- Unit : mV
- Data length : 360 seconds

### Data file name:

ECG\_Wake.mat (ECG\_Wake.csv), ECG\_N2.mat (ECG\_N2.csv),  
ECG\_N3.mat (ECG\_N3.csv), ECG\_REM.mat (ECG\_REM.csv)

### Data explanation:

- These data were captured while the person was in different sleep/wake conditions.

