

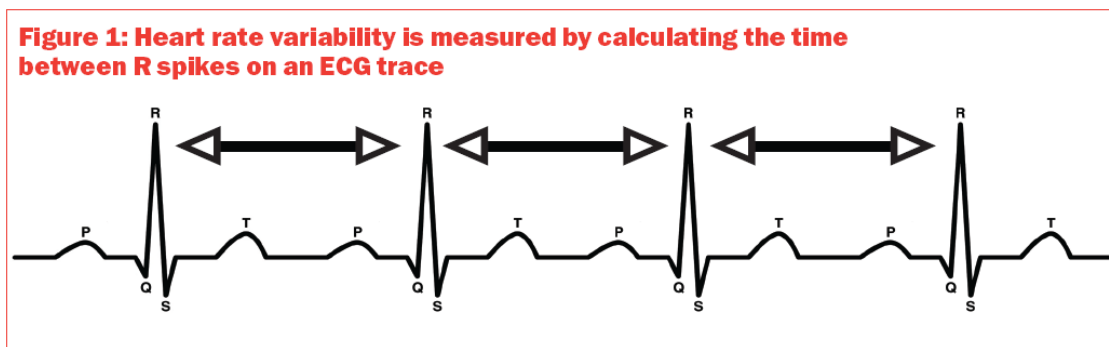
LECTURE 8

EXERCISE 1. ESTIMATION OF MEDITATIONS INFLUENCE ON THE AUTONOMIC NERVOUS SYSTEM

Test whenever Chi meditations influence the autonomic nervous system by the use of Heart rate variability analysis.

The file [ChiMedi.mat](#) includes the timing of ECG R peaks from a subject before (Sub1_Pre) and under meditation (Sub1_Med). The locations are in seconds. The data is from a published study:

[C. -K. Peng et al. Exaggerated heart rate oscillations during two meditation techniques. International Journal of Cardiology 1999.](#)



- Estimate and plot the RR Tachograms. The RR Tachograms is the individual RR intervals plotted against the time of occurrence.
- Is the RR Tachograms wide sense stationary?
- Is the RR Tachograms ergodic?
- What is the mean Heart rate before and under meditation?
- Since the RR Tachograms are sampled with an irregular sample rate use [resampleTacho.m](#) to resample the RR Tachograms to 4 Hz.
- Use the power spectrum to estimate the influence of meditation on the power in the LF (0.04-0.15 Hz) and HF (0.15-0.4 Hz) bands. Use the average periodogram method from lecture 6. If you didn't made the function download it [her](#).
- Parasympathetic activity is related to an increase in power in the HF band. Sympathetic activity is mainly related to Increase in LF power, but Sympathetic activity might also increase HF power. Therefore the power ratio between the LF and HF is often used to describes the balance between the sympathetic and parasympathetic nervous systems. Estimate the LF/HF ratio before and under meditation.