School of Electrical Engineering

Signal Theory: EQ1220 / EQ1210

Reading Assignment: Ergodicity and Power Spectrum (2/5) 2014–09–10,

Notice: To be collected before Lecture 4.
The essay consists of five questions. If you successfully answer all questions, you obtain 1 bonus point for part A of the final exam. An essay with partially correct answers will give you 1/2 point.
For the answers you should not copy text from a textbook. Group work is also not allowed, but feel free to discuss with your fellows. The reports will be checked against plagiarism.
Aim at being concise (max 2 pages).

Explain (in your own words) ...

1. ... how you intuitively understand the concept of *ergodicity*. Why ergodicity is important for the study of stationary stochastic processes (e.g., for estimation).

2. ... how you interpret partial ergodicity with respect to the acf.

3. ... how you interpret the Fourier transformation of time-valued signals. What is the meaning of the frequency? Why, in your opinion, is it useful to analyze the signals in the frequency domain?

4. ... what the *power spectrum* of a random process is, what information it provides about the process, what its properties are, and why it is called power spectrum.

5. ... what *white noise* means. Does it exist in nature or is it a model?
