School of Electrical Engineering

Signal Theory: EQ1220 / EQ1210

Reading Assignment: Ergodicity and Power Spectrum (2/5) 2016–08–31,

Notice: Should be sent to "ra.signal.theory@ee.kth.se" before Lecture 4 (2016–09–07),
and after self assessment, papers are collected on Lecture 5 (2016–09–13).
The essay consists of three 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.
Be brief, i.e., at most 1 page.

Explain (in your own words) ...

1. ... how you intuitively understand the concept of *ergodicity*.

2. ... why ergodicity is important for the study of stationary stochastic processes (e.g., for estimation). What is the "problem" with non-ergodic processes?

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 and what its properties are.

5. ... what AR, MA and ARMA processes are and how they are related to each other. Do you know any phenomena that can be modeled as ARMA processes?
