

SCHOOL OF ELECTRICAL ENGINEERING  
**Signal Theory**: EQ1220 / EQ1210

Reading Assignment: Ergodicity and Power Spectrum (2/5) 2015–09–02,

**Notice:** To be collected before Lecture 4 (2015-09-09)  
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.  
Be brief, i.e., at most 1-2 pages.

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Explain (in your own words) ...

1. ...how you intuitively understand the concept of *ergodicity*. What is the "problem" with non-ergodic processes?
  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 stochastic 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?
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