

Learning Objectives For ECE 421 Midterm2

March 2018

Overall, the material for this test covers up to and including Chapter 5 in the textbook. The focus will be on material studied after Midterm1. That said, the material is naturally layered, and mastery of previous material will be needed to do well on Midterm2. Students should be able to demonstrate the following skills, beyond those required: for Midterm1:

1. Discuss when the Fourier transform of a signal is defined and in what senses (mean square convergence and uniform convergence).
2. Apply dualities between different types of transforms (for aperiodic/periodic and continuous/discrete time signals) to simplify computations.
3. Partition a signal into odd/even and real/imaginary components when appropriate.
4. Apply properties of the Fourier transform.
5. Compute spectral characteristics of AM signals.
6. Evaluate how exponential and sinusoidal signals are processed by LTI systems.
7. Analyze the frequency response of difference equation systems.
8. Employ the geometric properties of how the pole zero plot affects the Fourier response of a difference equation system to evaluate such systems qualitatively.
9. Design simple filters based on pole and zero placement.
10. Identify different types of filters and signals (lowpass, bandpass, notch, etc.) based on their pole-zero plots.

And here are the formalities:

1. We intend Midterm2 to have a similar difficulty level (and possibly a bit easier) than Midterm1.
2. You need to work out your solutions by hand and justify (explain) your answers.
3. While the WebWork homeworks were along the lines of “training” questions that familiarize you with concepts, the Midterm will have questions at different difficulty levels. (See tests in previous years for examples.)
4. Open book; open handouts; open notes. Simple calculators will be allowed; communicating devices will not.

5. There may be a question (or part of a question) that uses Matlab. (Again, see tests in previous years for examples. As discussed in class, Matlab parts are intended to be straightforward.)
6. There will likely be questions (or parts of questions) that resemble old tests, and questions you've seen in class, homework, and projects.