Spring 2020 EE3221
Learning Objectives - Midterm Exam
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For the Midterm Exam, you should be able to...

1. Identify and explain the difference between continuous-time and discrete-time signals and systems.
2. Determine the spectrum of a continuous-time signal that has undergone impulse-train sampling.
3. State, explain, and interpret the Nyquist Sampling Theorem.
4. Explain the concept of aliasing and recognize conditions under which it occurs.
5. Determine the sampling rate required for alias-free sampling of a given continuous-time signal.
6. Explain the purpose of a reconstruction filter and choose an appropriate filter given a specified sampling rate.
7. Identify, explain, and analyze systems that reconstruct continuous-time signals from impulse-train sampled signals.
8. Plot discrete-time signals and utilize common signals such as the unit-sample, unit-step, real-valued exponentials, sinusoids, and complex exponentials.
9. Characterize discrete-time signals in terms of periodicity (including determining their fundamental period), signal energy/power (including calculating, as appropriate, signal energy or power), and even/odd symmetry (including determining the even and odd decomposition of a signal).
10. Represent a discrete-time signal as a weighted sum of shifted unit-samples.
11. Characterize a system as MA, AR, or ARMA given its difference equation.
12. Classify discrete-time systems as to linearity, time-invariance, causality, stability, and memory.
13. Utilize linear constant coefficient difference equations in the analysis of discrete-time signals and systems.
14. Utilize the convolution sum in the analysis of discrete-time signals and systems.
15. Determine the Z-Transform of a discrete-time sequence using the Z-transform sum.
16. Utilize tables of Z-Transform pairs and properties to transform between discrete-time sequences and their Z-domain representations.
17. Calculate inverse Z-Transforms, including the use of partial fraction expansion.
18. Utilize the Z-Transform in the analysis of discrete-time signals and systems.
19. **Quantization Error Lab**: Determine the range of quantization error for an N-bit quantizer and input voltage range.