

Final Exam Review

Administrative

- Final Exam Tuesday 5/8 10:10 - 12:10
- 2 page of double-sided notes (Tables are not provided)
- No calculators
- Will cover entire course. Remember Laplace Transform has not yet been tested.

Practice Problems

Be sure to understand the homework problems. They are good example problems. Additional problems (provided below) can be found in Shaum's Outlines for Signals and Systems which was a recommended book for the class. If you need scans of problems please let me know.

Signals and Systems

Topics

Complex numbers, Euler's formula, signal operations (time shift, scale, and reversal), system properties (memoryless, invertible, causal, stable, linear, time-invariant)

Problems

Shaum 1.1, 1.2, 1.32a, 1.34, 1.39

LTI Systems

Topics

Impulse response, convolution (flip and drag technique), system properties (memoryless, invertible, causal, stable), exponentials as eigen signals

Problems

Shaum 2.4, 2.5, 2.18, 2.19, 2.28, 2.29, 2.30, 2.38, 2.40, 2.41, 2.43, 2.45, 2.58, 2.62

Fourier Series

Topics

Periodicity of a signal (find fundamental period and frequency), analysis and synthesis equation for FS (periodic signal as linear combination of harmonic complex exponentials), FS Properties (Tables 3.1, 3.2), FS with LTI systems (eigen signal result)

Problems

Shaum 5.4, 5.7a, 5.9a, 5.10, 5.12, 5.61(a,b), 6.3, 6.5, 6.6, 6.62, 6.63, 6.65, 6.66

Fourier Transform**Topics**

FT and iFT equations, FT of periodic signals, CTFT properties and pairs (Table 4.1 and 4.2), linear constant coefficient differential equations, partial fraction expansion, DTFT differences (2π period for FT), DTFT properties and pairs (Table 5.1 and 5.2), LTI system analysis, linear constant coefficient difference equations.

Problems

Shaum 5.19, 5.21, 5.23, 5.24, 5.26, 5.29, 5.35, 5.36, 5.40, 5.44, 5.45, 5.67, 6.31, 6.32, 6.33

Laplace Transform**Topics**

Extension of FT for non-stable systems and requires a ROC, 8 properties of ROC, pole-zero plots, LT properties and pairs (Table 9.1, 9.2), LTI systems properties (causal and stable), unilateral LT for differential equations with initial conditions (zero-state and zero-input responses)

Problems

Shaum 3.3, 3.5, 3.6, 3.9, 3.13, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.25, 3.28, 3.29, 3.30, 3.37, 3.38, 3.55