

Final Exam Overview

Test Format:

Open-book, open-notes. 2.5 hour time limit.

Test #1 Material (≈ 25%)

Laplace Transforms:

- Finding Laplace transforms and inverse Laplace transforms
- Circuit Analysis using Laplace Transforms
- Be able to find initial conditions ($v_C(0)$ and $i_L(0)$ only)
- Transfer functions (Finding $H(s)$ and the unit step response and impulse response)

Test #2 Material (≈ 25%)

Properties of signals and systems

Differential equation representation of a system

Finding the impulse response from the unit step response

Convolution – graphically determine $y(t)$ given $h(t)$ and $x(t)$

Test #3 Material (≈ 25%)

Frequency Response:

- Finding $H(s)$ and $H(j\omega)$ for a circuit
- Basic filter types
- Impedance and frequency scaling
- Bode (LM) plots
- No phase plots or complex roots on the Final Exam

Test #4 Material (≈ 25%)

Fourier Series

- Determine coefficients
- Symmetry
- Standard form, alternate trigonometric form, exponential form
- Determining circuit outputs with periodic waveform inputs
- RMS value of a periodic waveform
- Line spectra and phase spectra

Fourier transforms

- Find Fourier transforms and inverse Fourier transforms using the integral definition
- Fourier transform properties
- Special functions: $\text{sinc}(x)$, $\text{sgn}(t)$, $\text{rect}(t/\tau)$
- Parseval's theorem: Calculating energy in the time and frequency domain
- Spectral density