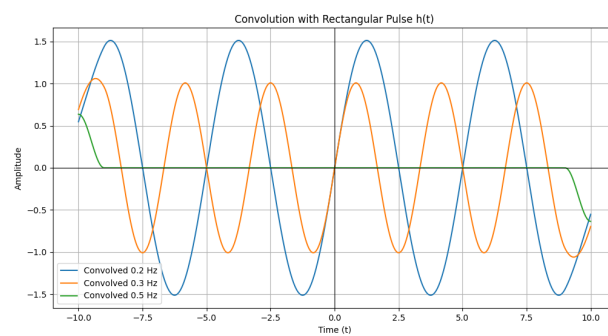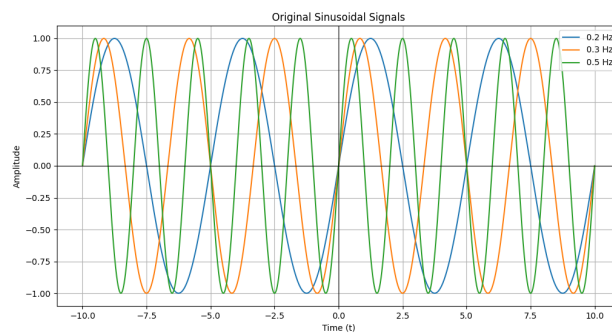# Spectral Analysis of Convolution with a Rectangular Kernel
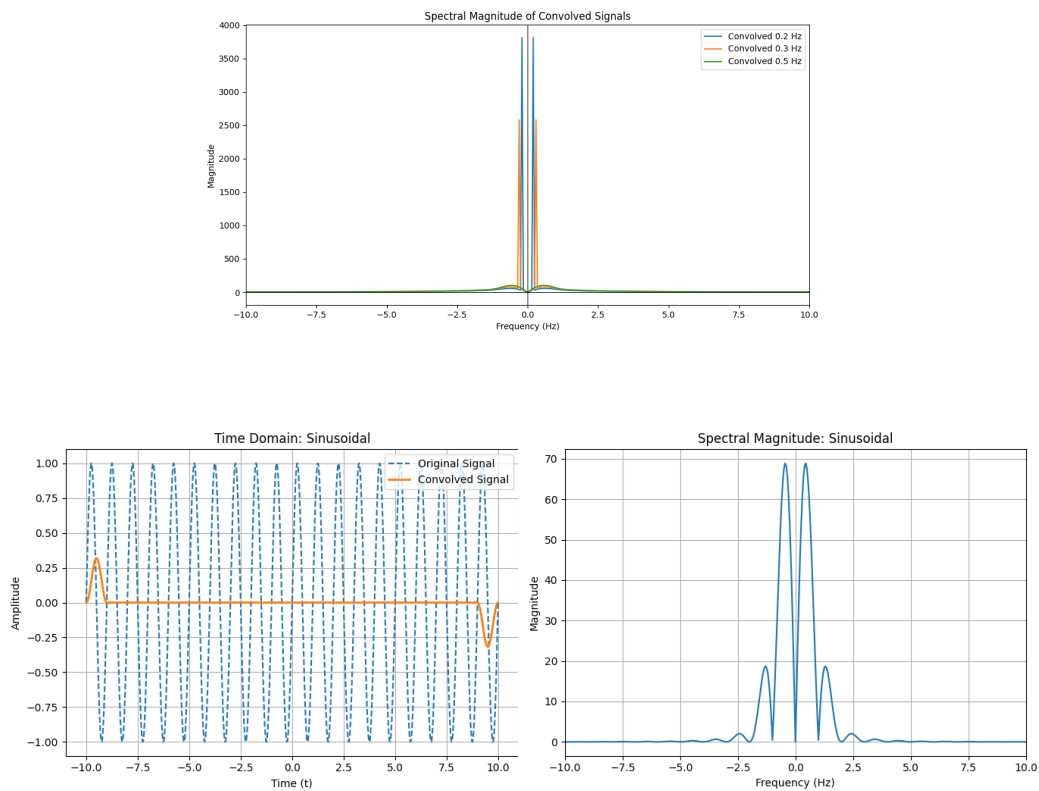
Group Quiz 02 - EE1060

Spring 2025

Spectral Analysis of convolution of $h(t)$ with various $f(t)$
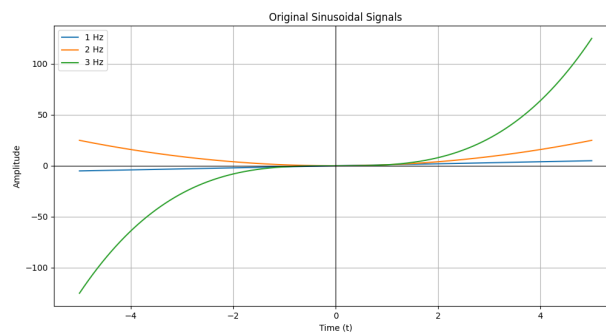
Trigonometric Functions

Spectral Magnitude of Convolved Signals

Time Domain: Sinusoidal

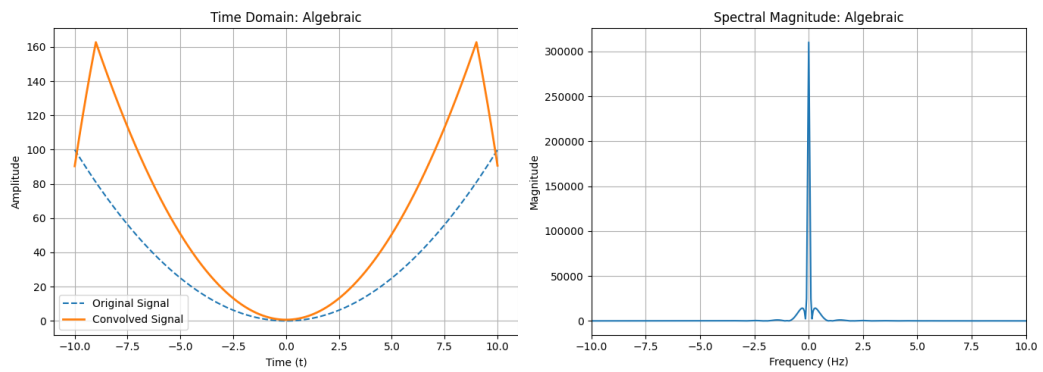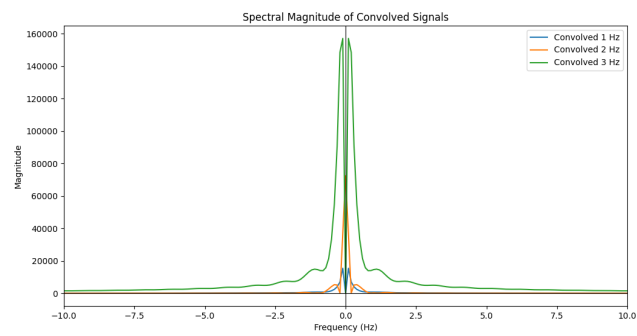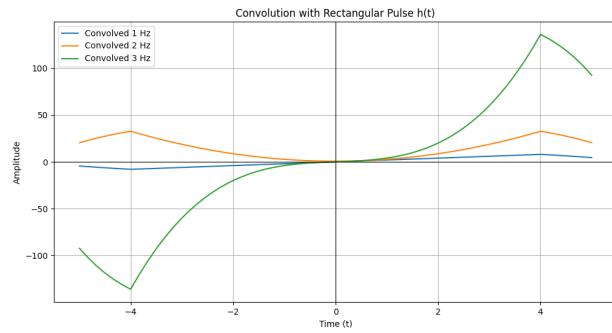
Spectral Magnitude: Sinusoidal

The rectangular kernel acts as a low-pass filter by scaling the amplitudes of higher frequencies in convolution. Peaks in the spectral analysis plot can be seen at frequencies of the trigonometric functions as they oscillate with that frequency.
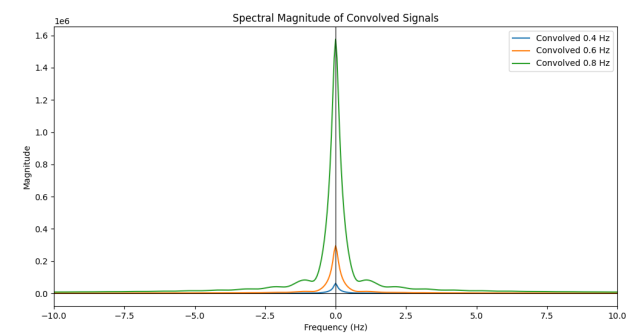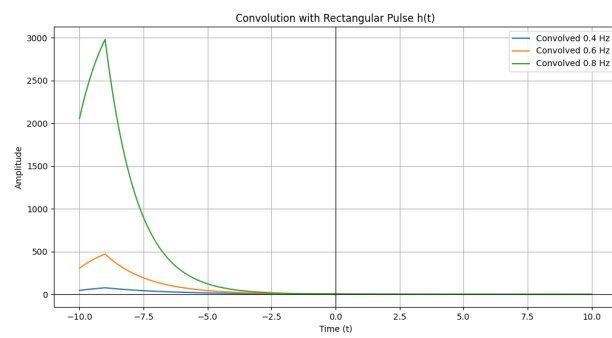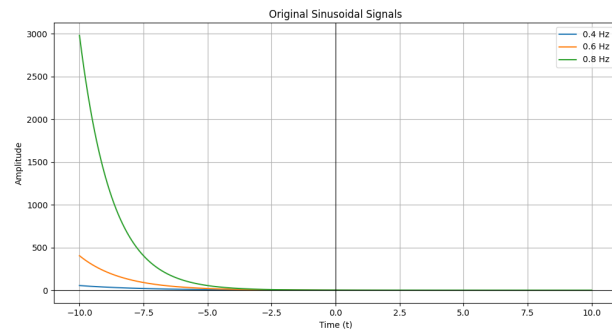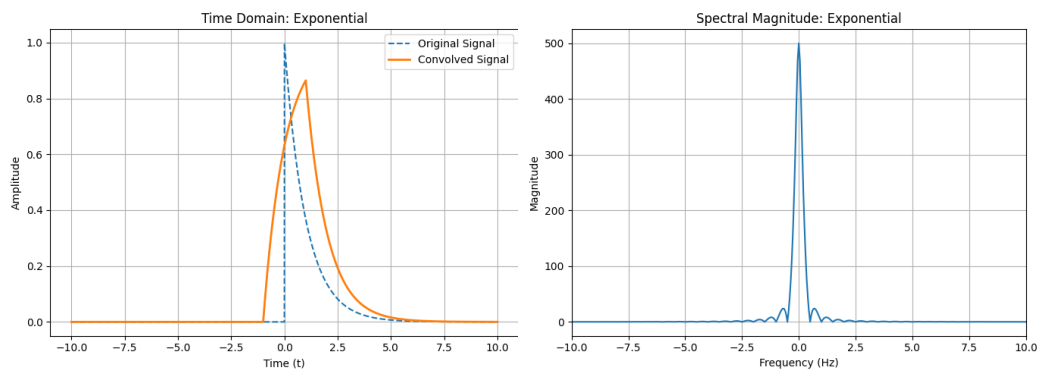
Algebraic functions

Original Sinusoidal Signals

Peak in spectral Analysis can be seen at frequency=0 as no oscillation

Exponential Functions

Original Sinusoidal Signals

Convolution with Rectangular Pulse h(t)

Spectral Magnitude of Convolved Signals

Peak in spectral Analysis can be seen at frequency=0 as no oscillation

Logarithmic Functions

Peak in spectral Analysis can be seen at frequency=0 as no oscillation

Inverse Tigonomentric Functions

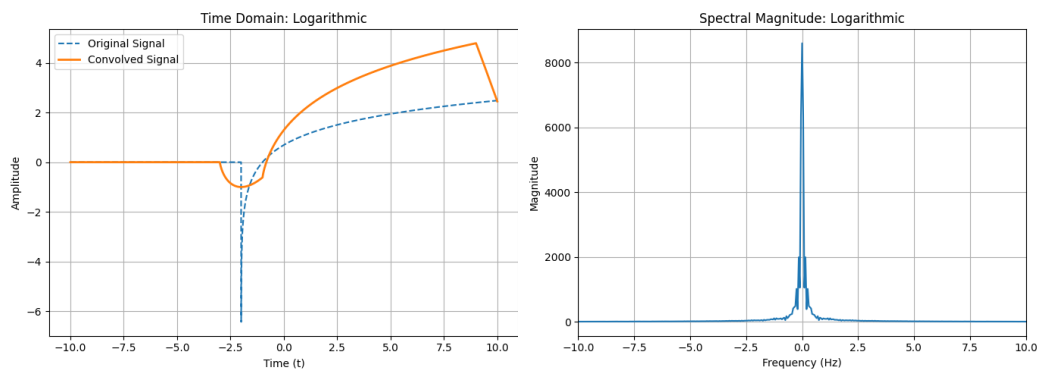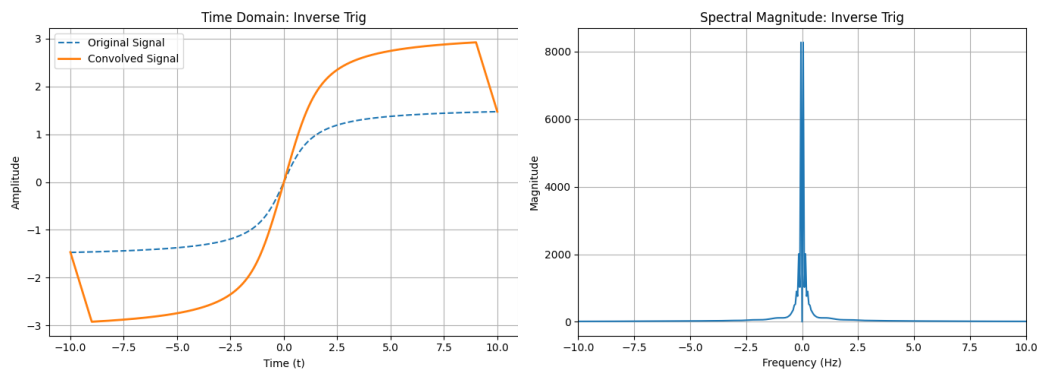Peak in spectral Analysis can be seen at frequency=0 as no oscillation