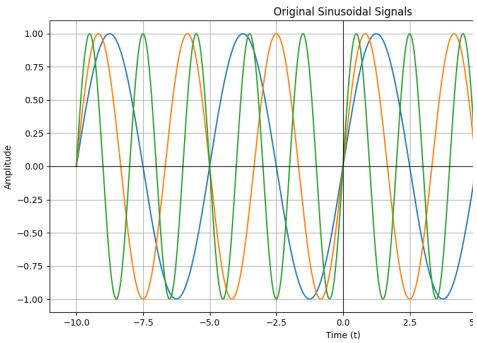
Spectral Analysis of Convolution with a Rectangular Kernel

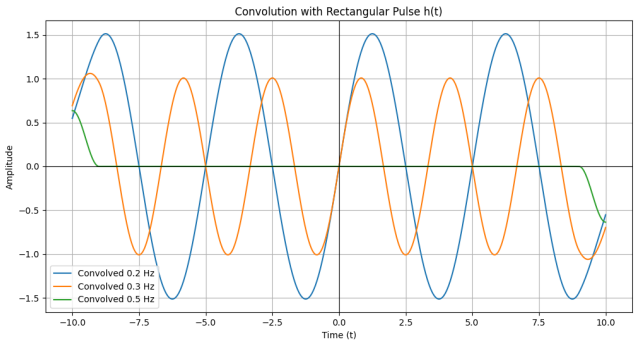
Group Quiz 02 - EE1060

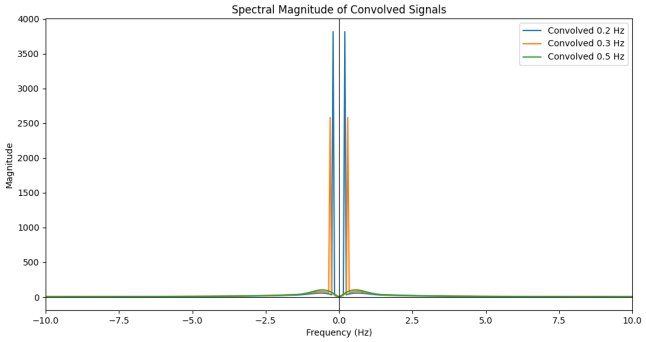
Spring 2025

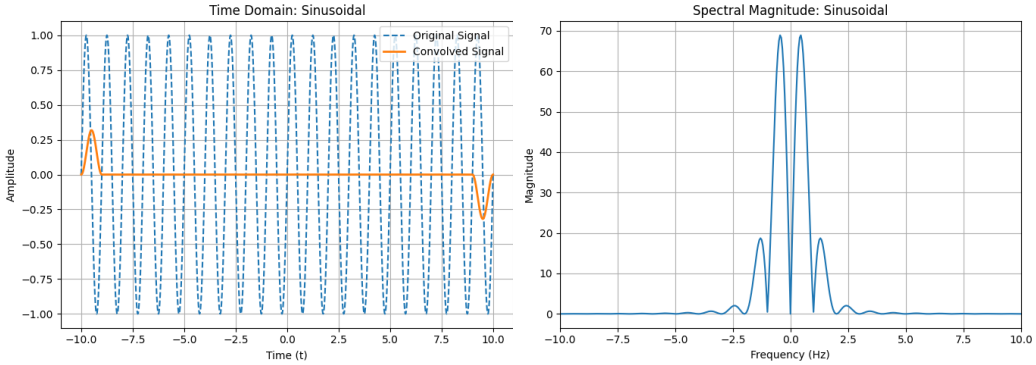
Spectral Analysis of convolution of $h(t)$ with various $f(t)$

Trigonometric Functions



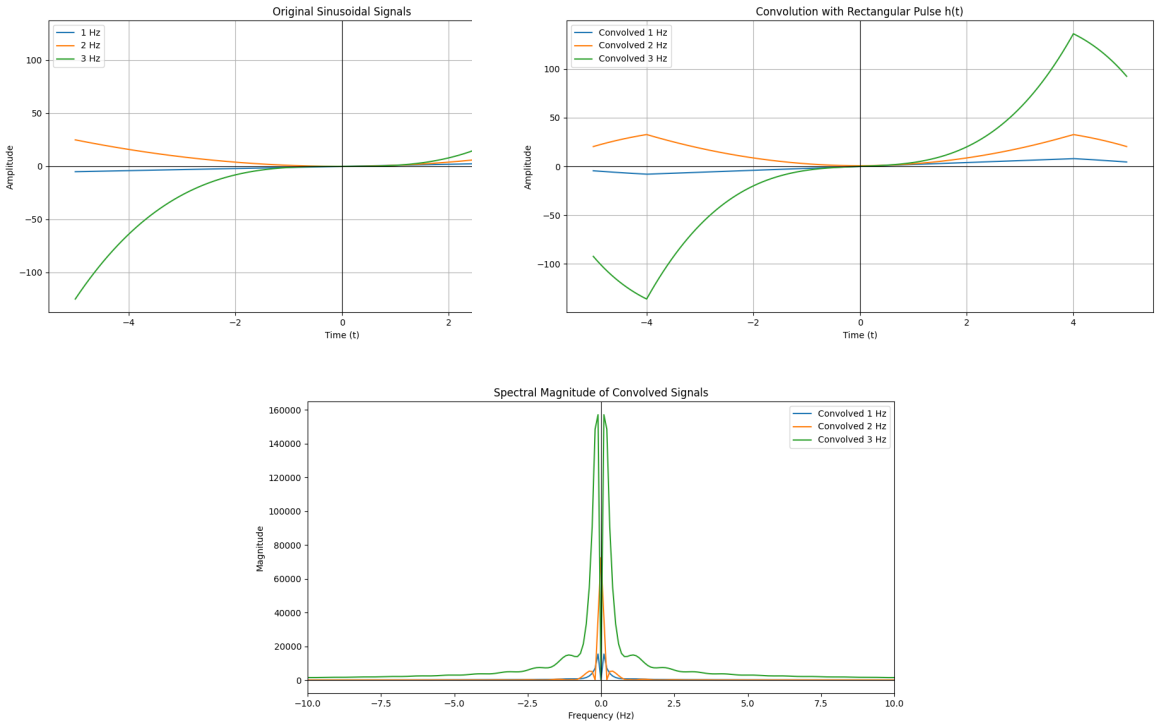


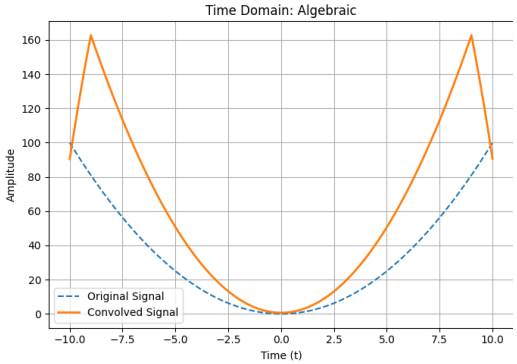


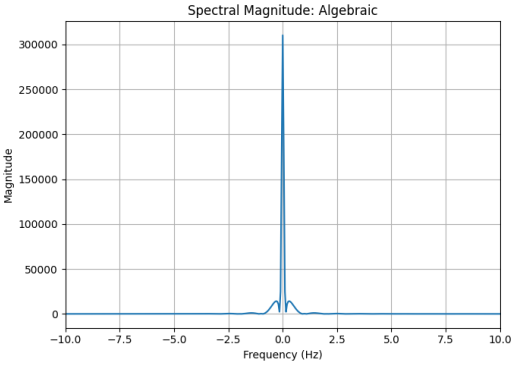


The rectangular kernel acts as a low-pass filter by scaling the amplitudes of higher frequencies in convolution. Peaks in the spectral analysis plot can be seen at frequencies of the trigonometric functions as they oscillate with that frequency.

Algebraic functions

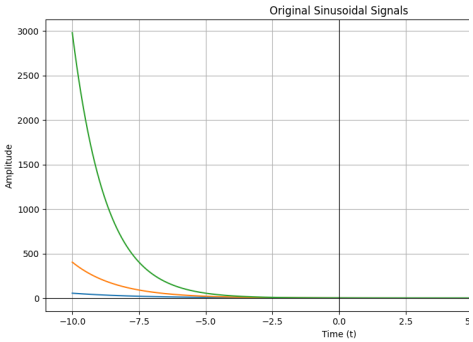


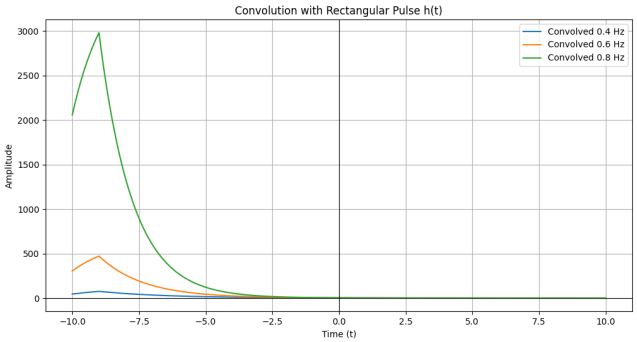


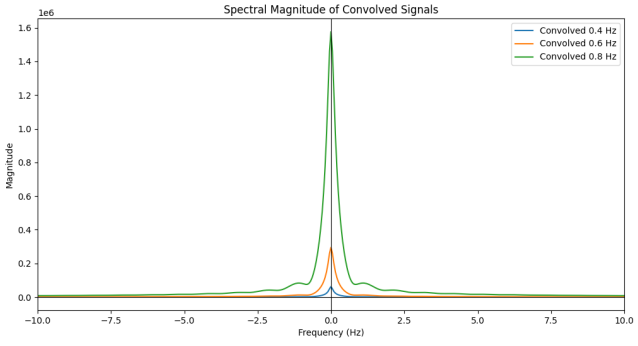


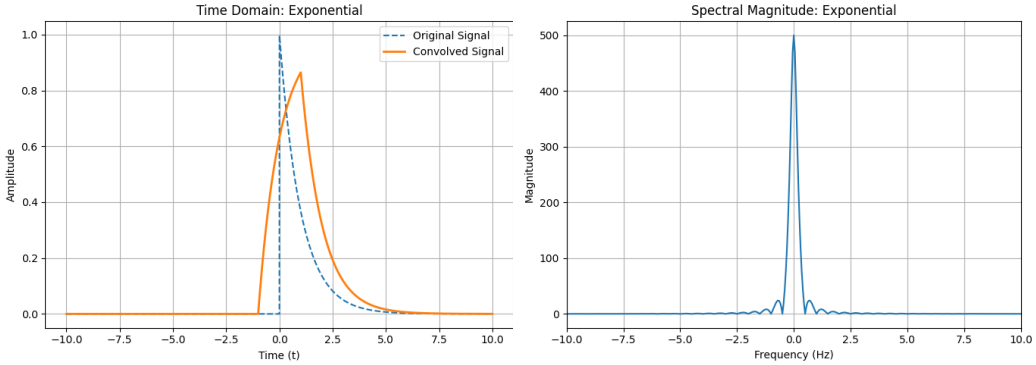
Peak in spectral Analysis can be seen at frequency=0 as no oscillation

Exponential Functions



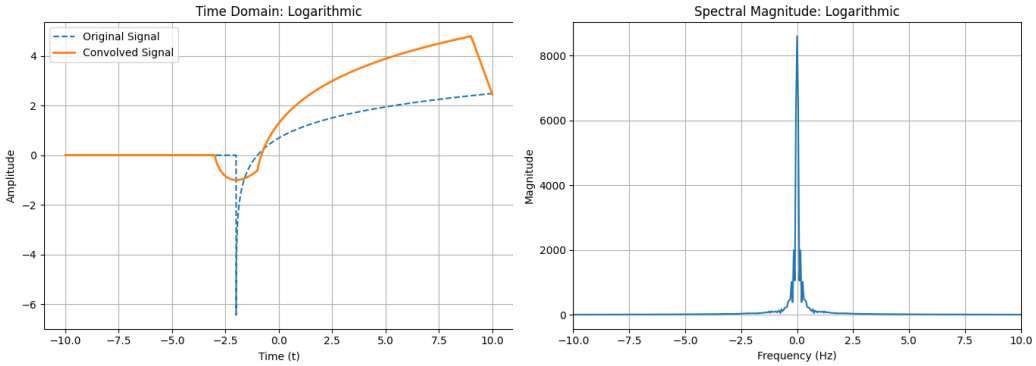






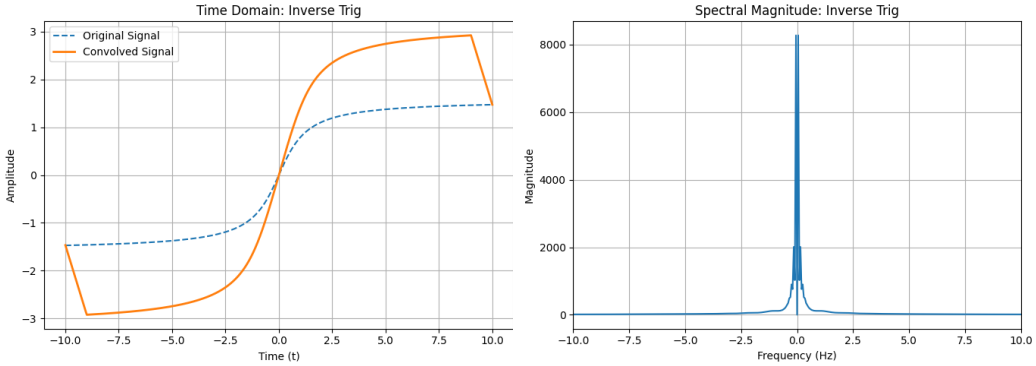
Peak in spectral Analysis can be seen at frequency=0 as no oscillation

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