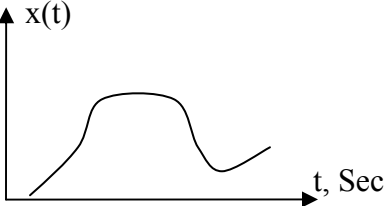
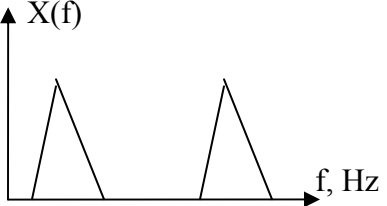
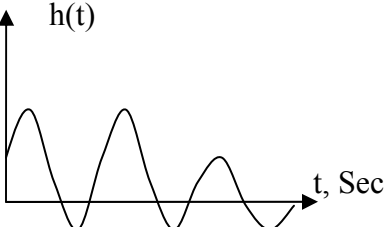
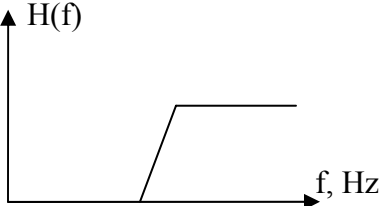
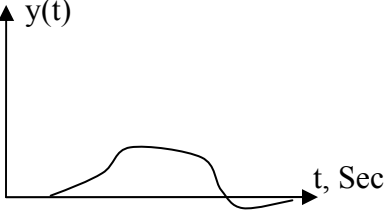
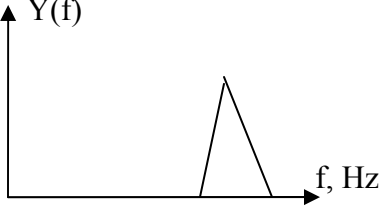


EE228 – Use of Time/Frequency Transforms for Analysis - Dr Fred DePiero

These figures illustrate time and frequency relationships for signals and systems in a **conceptual** manner. We will actually study three types of transforms which have different forms in the frequency domain. For example we use a plane, not a 1-D function with the Laplace transform.

	Time/Frequency Transform \longleftrightarrow	
Input Signal		Input Signal
	Time/Frequency Transform \longleftrightarrow	
Impulse Response		System Function
	Time/Frequency Transform \longleftrightarrow	
Output Signal $y(t) = x(t) * h(t)$ [Convolution]		Output Signal $Y(f) = X(f) H(f)$ [Multiplication]

Notes

- Time/Frequency analyses useful to:
 - Examine energy content of signals as a function of frequency
 - Examine frequency response of a system, such as a filter
 - Find response of a system to a particular input
- We study 3 time/frequency transforms:
 - Laplace Transform
 - Fourier Transform
 - Fourier Series
- Axes in frequency domain have both negative and positive extent (only positive is shown above).
- Signals in frequency domain (spectra) are typically complex valued. Magnitude is indicated above, not phase.
- The impulse response, $h(t)$, is the response (output) of the original system to an impulse input.