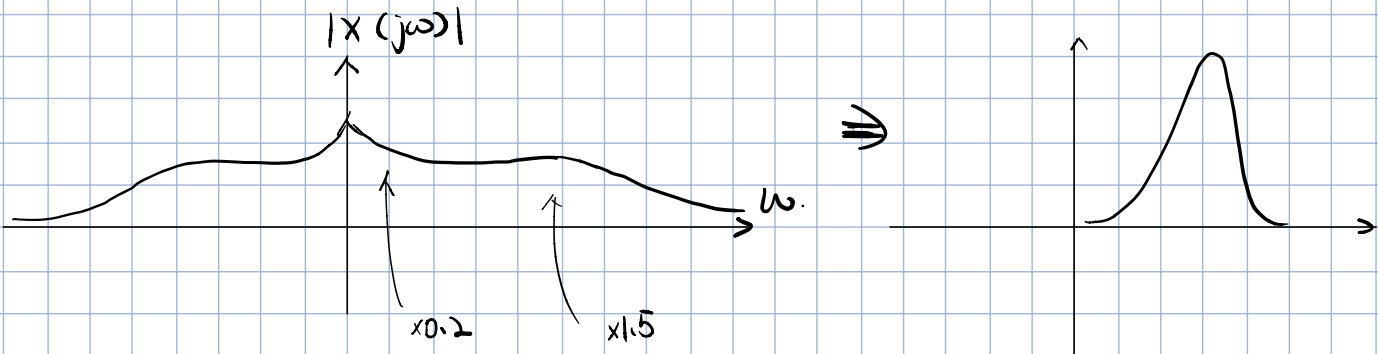


Filtering

is the process of changing the relative magnitude of the freq. components in the spectrum (Fourier Transform) of a signal.

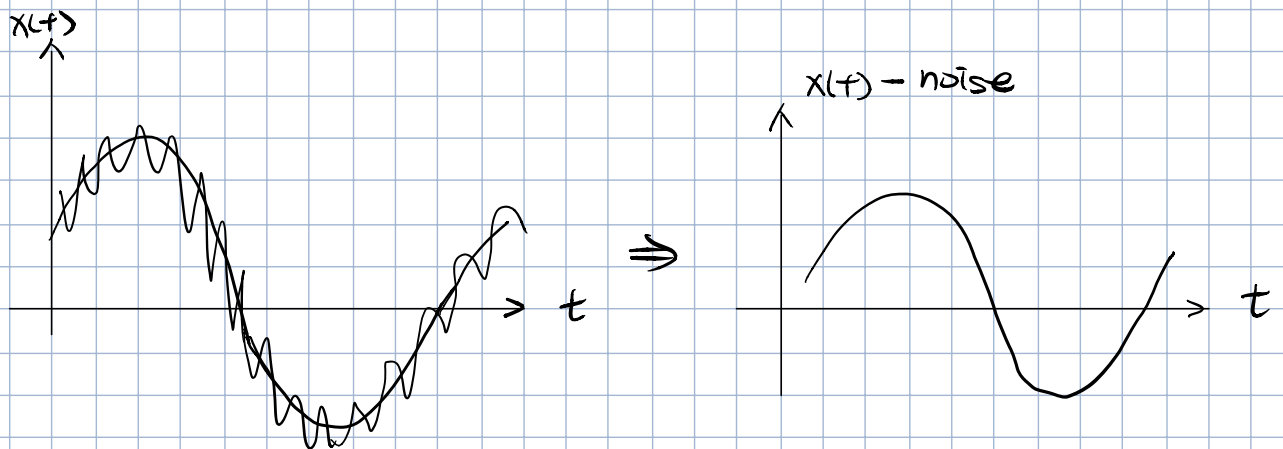


Frequency-Selective Filters:

A class of filters that ideally pass a band of freq. unaltered and rejects other freq.

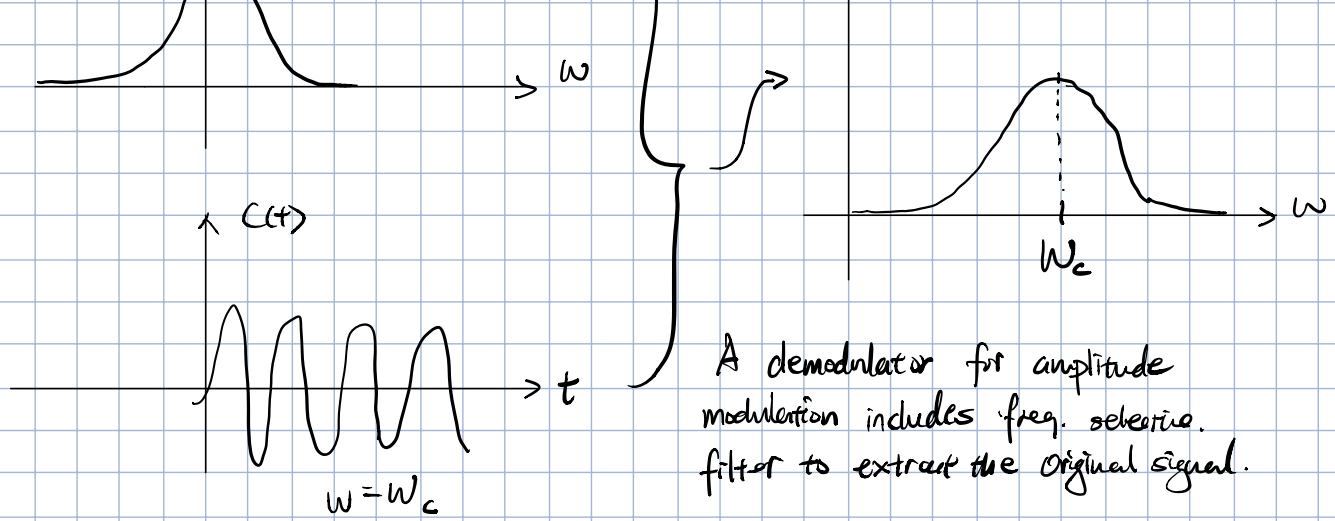
Applications of freq. selective Filters:

Noise removal



* AM in communication systems.:

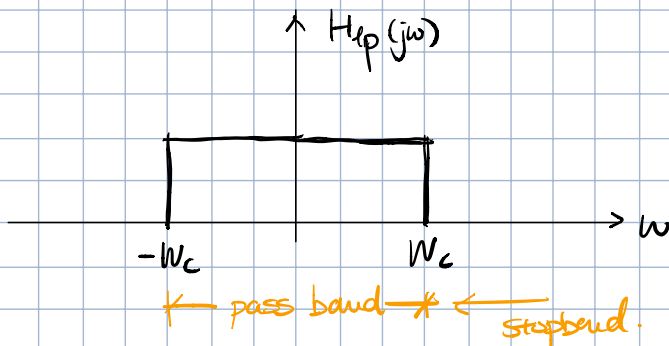




Ideal Frequency Selective Filters.

1. Low-pass filter. A filter that passes low-freq. components and rejects higher frequencies.

$$H_{lp}(j\omega) = \begin{cases} 1 & |\omega| < \omega_c \\ 0 & |\omega| > \omega_c \end{cases} \quad \Delta H_{lp}(j\omega) = 0$$



LTI system:

$$y(t) = x(t) * h(t)$$

$$Y(j\omega) = X(j\omega) H(j\omega)$$

DT filter.

$$H_{lp}(e^{j\omega}) = \begin{cases} 1 & |\omega| < \omega_c \\ 0 & \omega_c < |\omega| < \pi \end{cases} \quad \text{for } -\pi < \omega < \pi$$

$$\Delta H_{lp}(e^{j\omega}) = 0$$

