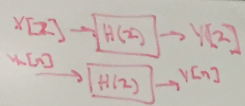


Freq. Domain:



$$Y[n] = -aY[n-1] + bX[n]$$

Take z-transform:

$$Y[z] = -a z^{-1} Y[z] + b X[z]$$

$$Y[z] [1 + a z^{-1}] = b X[z]$$

$$\frac{Y[z]}{X[z]} = H(z) = \frac{b}{1 + a z^{-1}}$$

Ex: $X[n] = \delta[n]$
 $X[z] = 1$

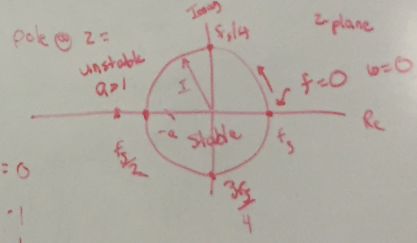
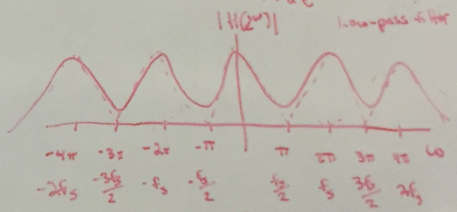
$$Y[z] = H(z) X[z] = \frac{b}{1 + a z^{-1}}$$

$$Y[n] = b(-a)^n u[n]$$

Freq. Response:

$$H(z) = \frac{b}{1 + a z^{-1}}$$

$$H(e^{j\omega}) = \frac{b}{1 + a e^{-j\omega}} \Rightarrow |H(e^{j\omega})| = \frac{|b|}{|1 + a e^{-j\omega}|}$$



$$1 + a z^{-1} = 0$$

$$a z^{-1} = -1$$

$$z^{-1} = -\frac{1}{a}$$

$$z = -a$$