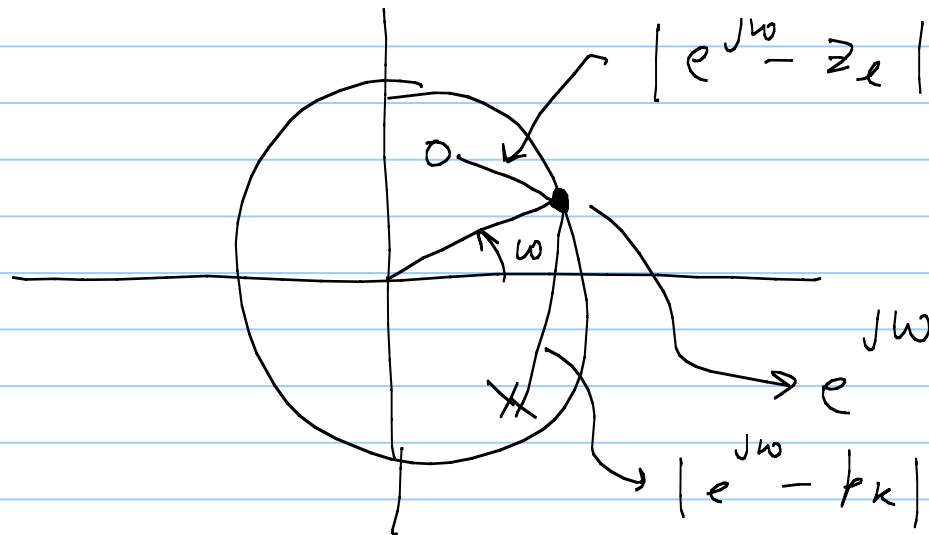


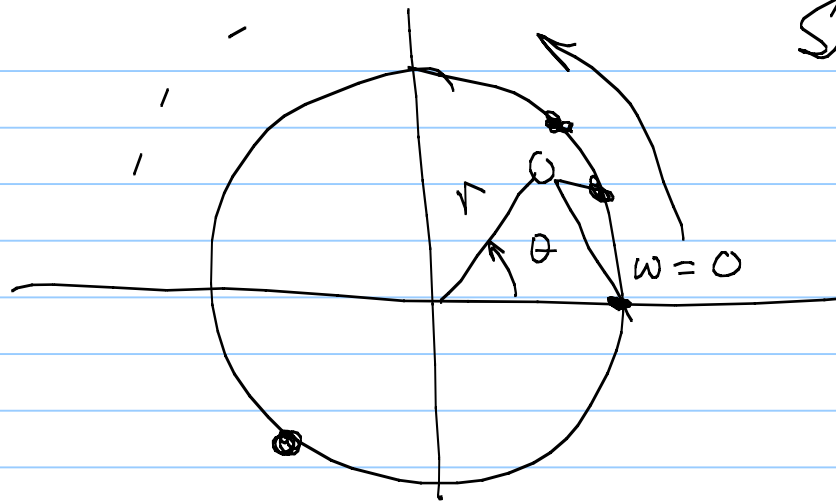
EC 5142 20 Oct 2011

Note Title

20-10-2011

$$|H(e^{j\omega})| = |k| \underbrace{|e^{j\omega(N-m)}|}_{1} \frac{\prod_{l=1}^M |e^{j\omega} - z_l|}{\prod_{k=1}^N |e^{j\omega} - p_k|}$$





Single complex zero

$$re^{j\theta}$$

$$H(z) = 1 - re^{j\theta} z^{-1}$$

$$|H(e^{j\omega})|^2 = |1 - re^{j\theta} e^{-j\omega}|^2$$

$$= 1 + r^2 - 2r \cos(\omega - \theta)$$

$$10 \log_{10} (1+r)^2$$

$$10 \log_{10} (1-r)^2$$

$$|H(e^{j\omega})|^2$$

min

$$= (1-r)^2$$

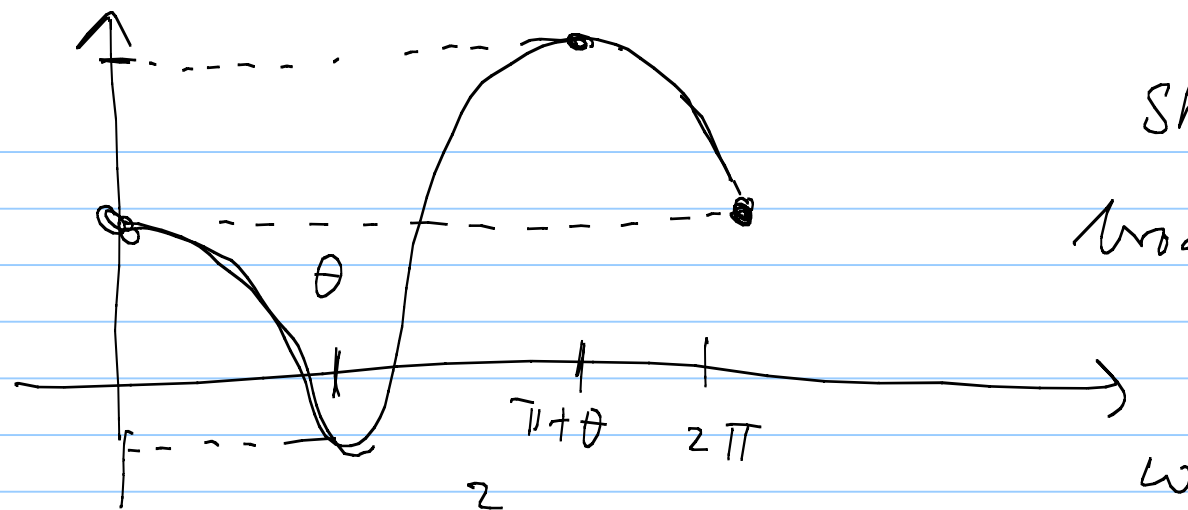
$$\text{for } \omega = \theta$$

$$|H(e^{j\omega})|^2$$

max

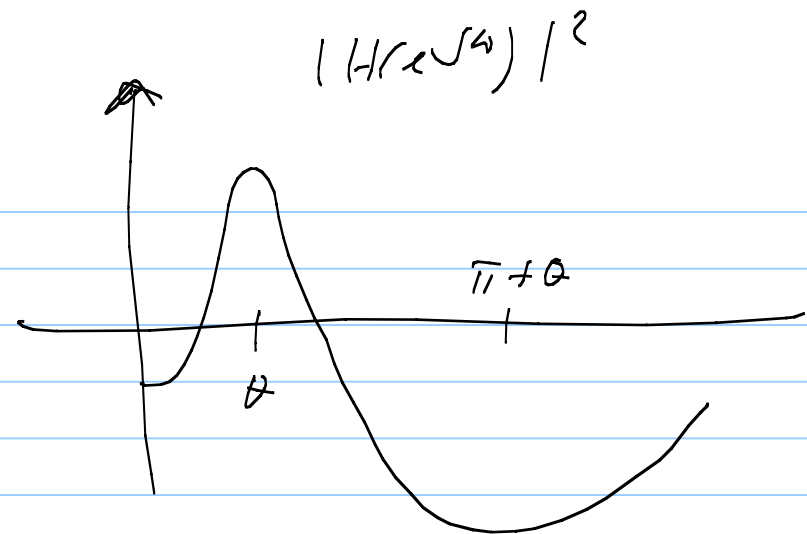
$$= (1+r)^2$$

$$\text{for } \omega = \pi + \theta$$



Sharper valley
broader peak

$$H(z) = \frac{1}{1 - re^{j\theta} z^{-1}}$$



sharper
peak

broader
valley