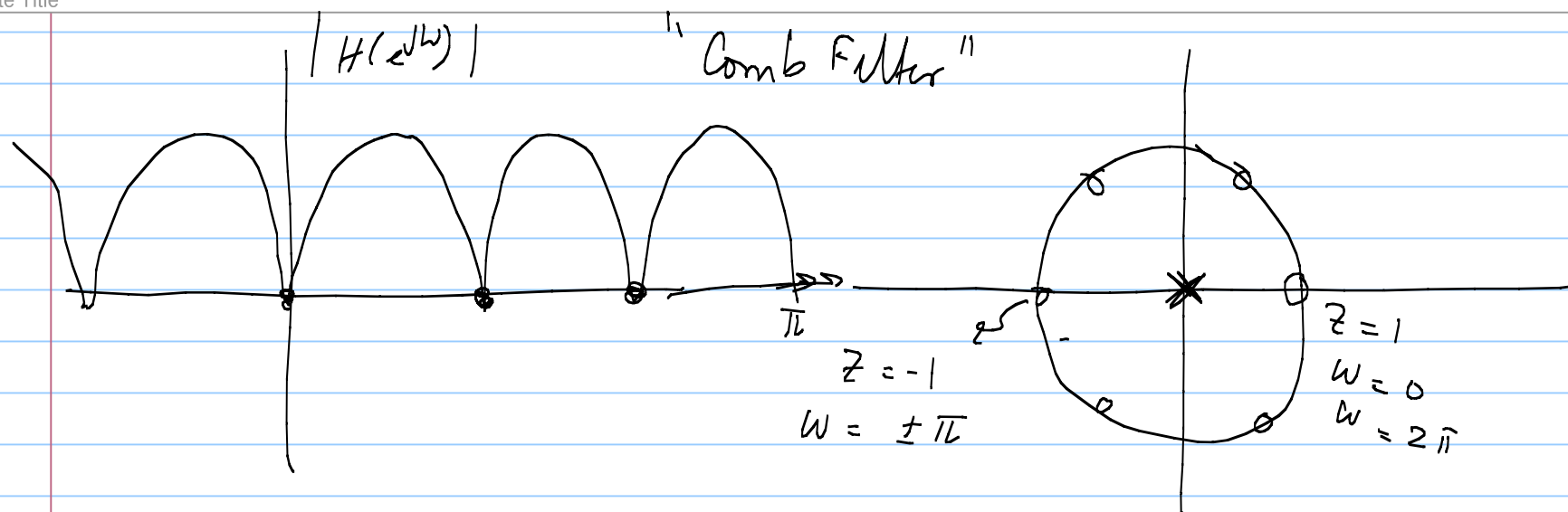


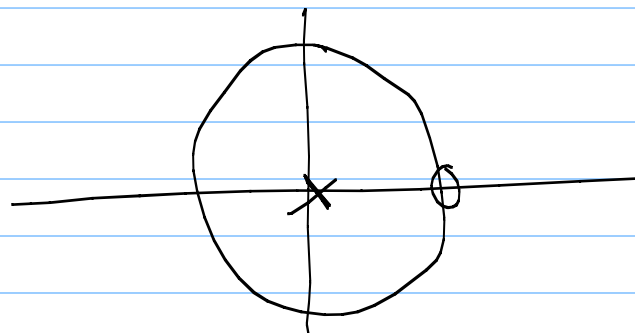
EC 5142 Oct. 31 2011

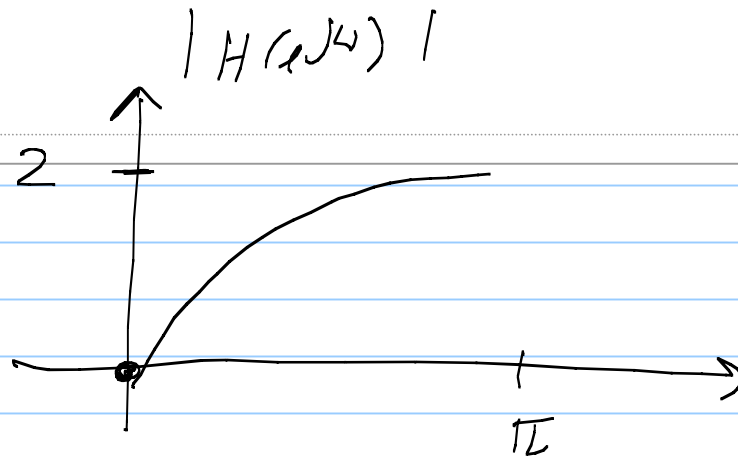
Note Title

31-10-2011



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



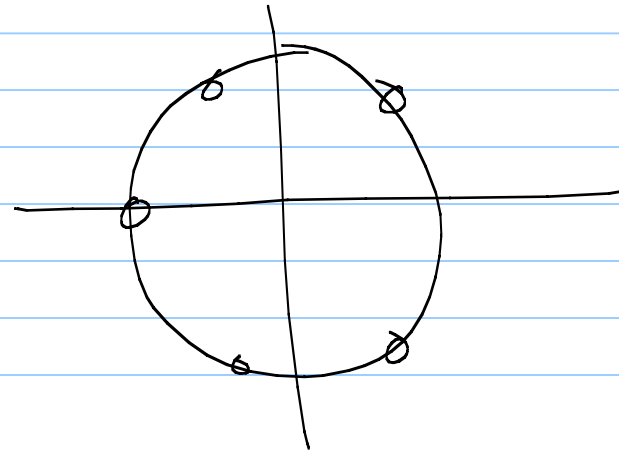


$$|1 - e^{-j\omega}|$$

$$H(z^L) = \frac{1 - z^{-L}}{1 - z^{-1}}$$

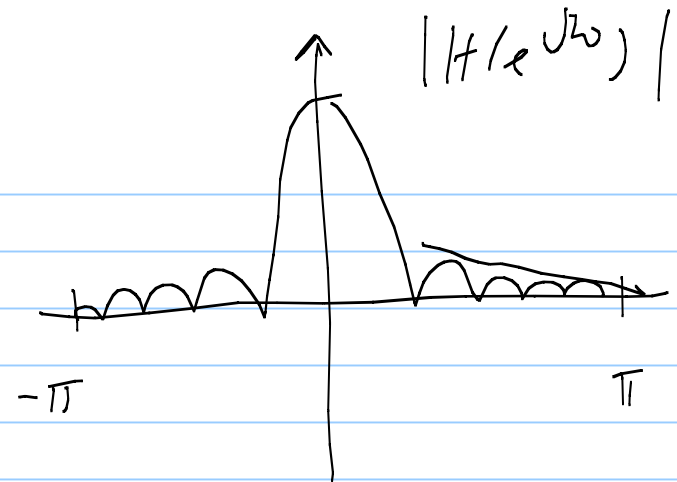
$$|1 - e^{-j\omega L}|$$

$$H(z) = \frac{1 - z^{-N}}{1 - z^{-1}}$$

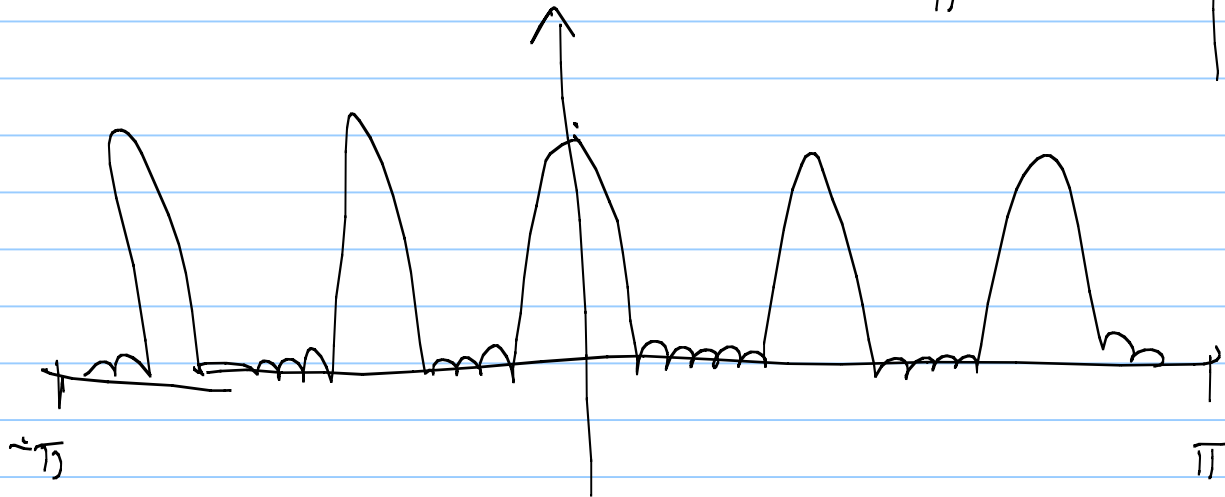


$$H(e^{j\omega}) = e^{-j(N-1)\omega/2}$$

$$\frac{\sin N\omega/2}{\sin \omega/2}$$

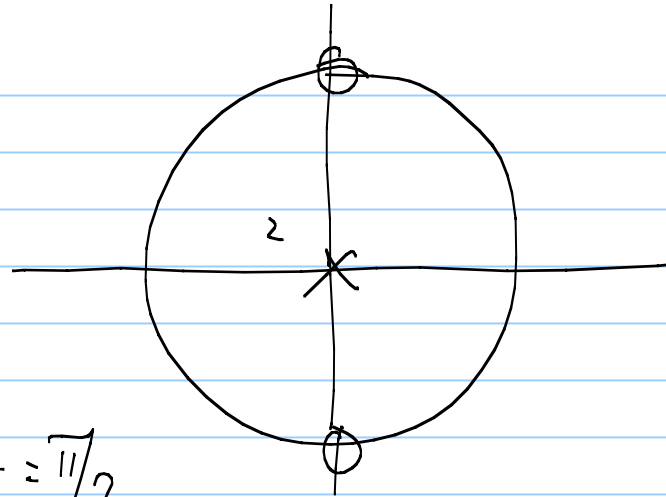


$$|H(e^{j\omega})|$$



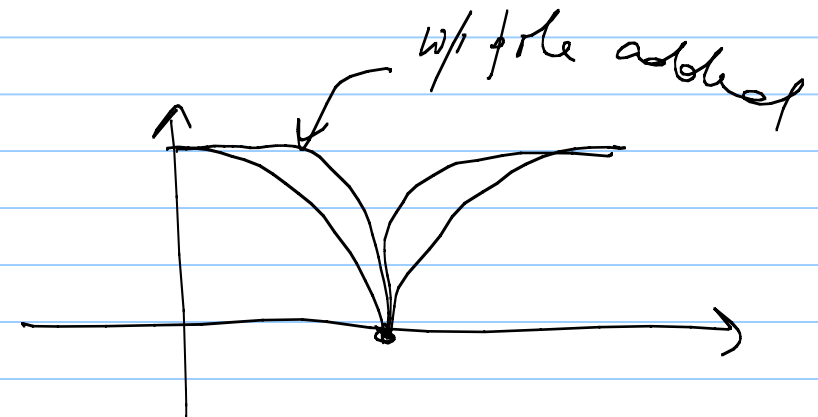
"Comb Filter"

Notch Filter:

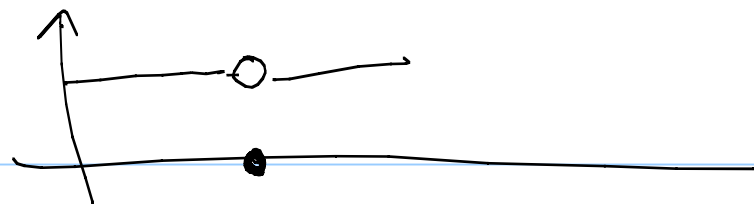


$$H(z) = 1 + z^{-2} \quad r=1, \theta=\pi/2$$

$$H(z) = 1 - 2r \cos \theta z^{-1} + r^2 z^{-2}$$

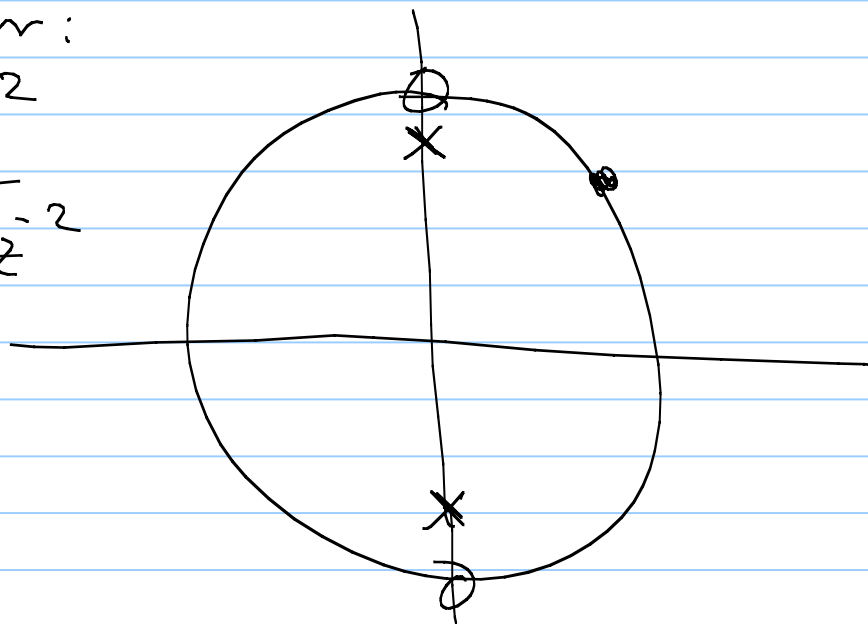


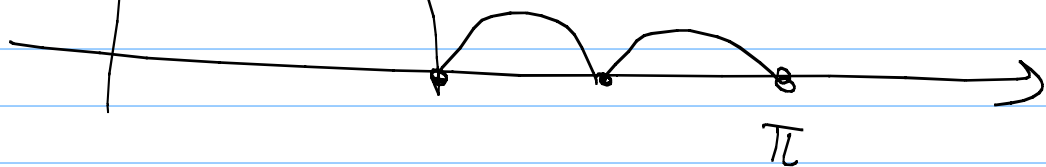
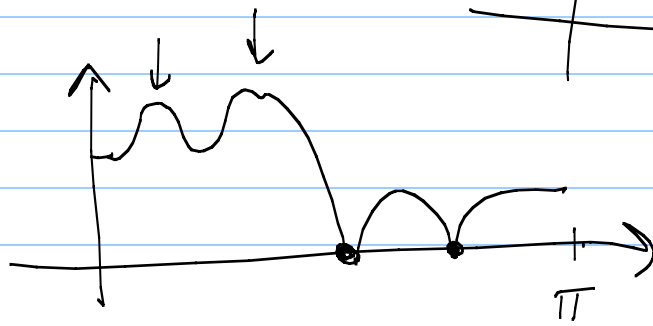
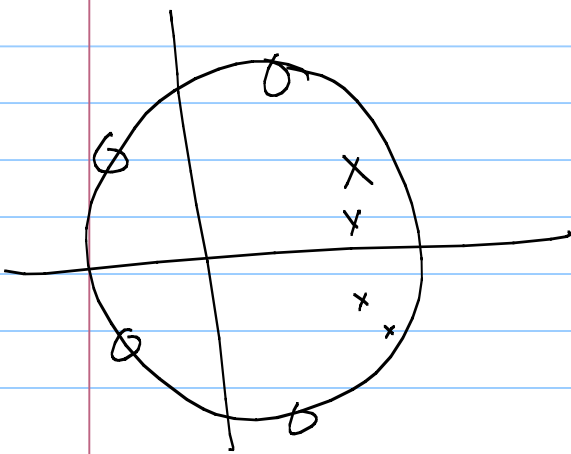
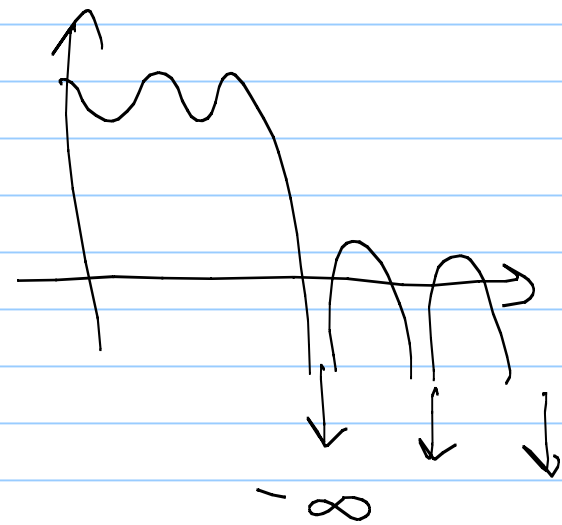
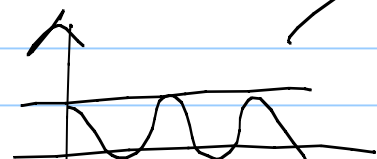
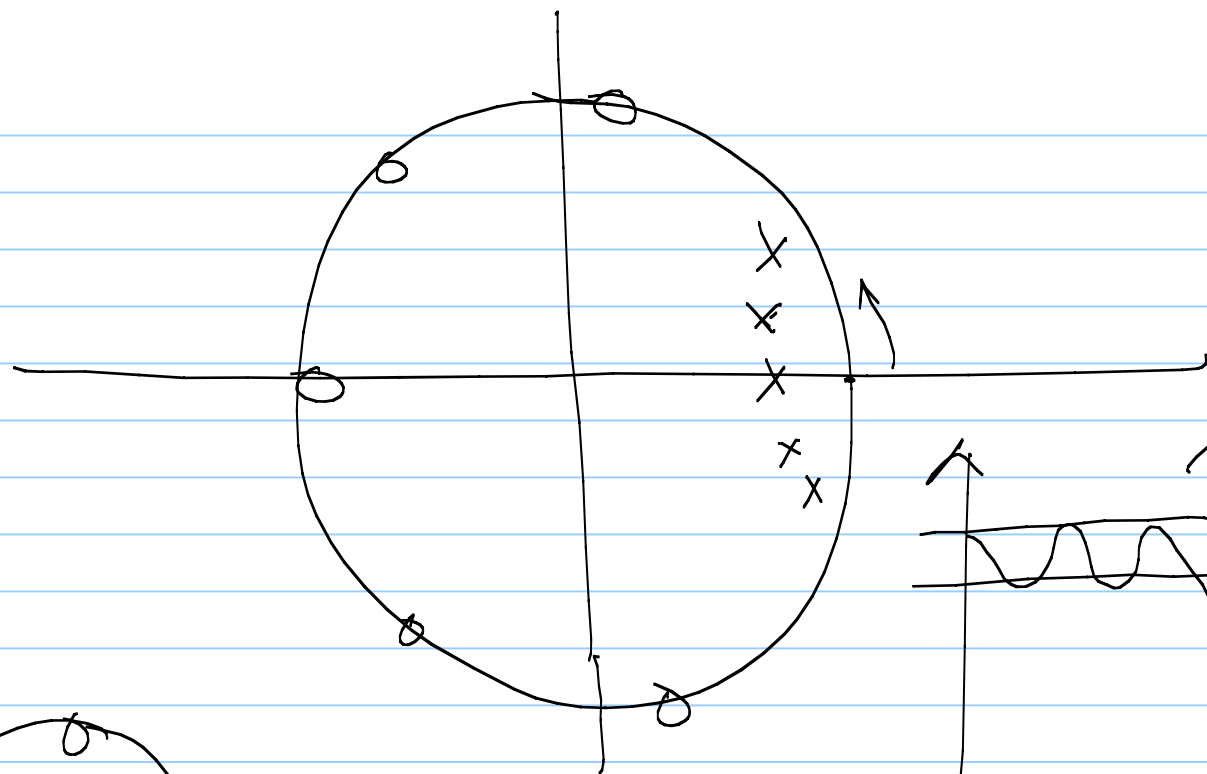
Ideal:

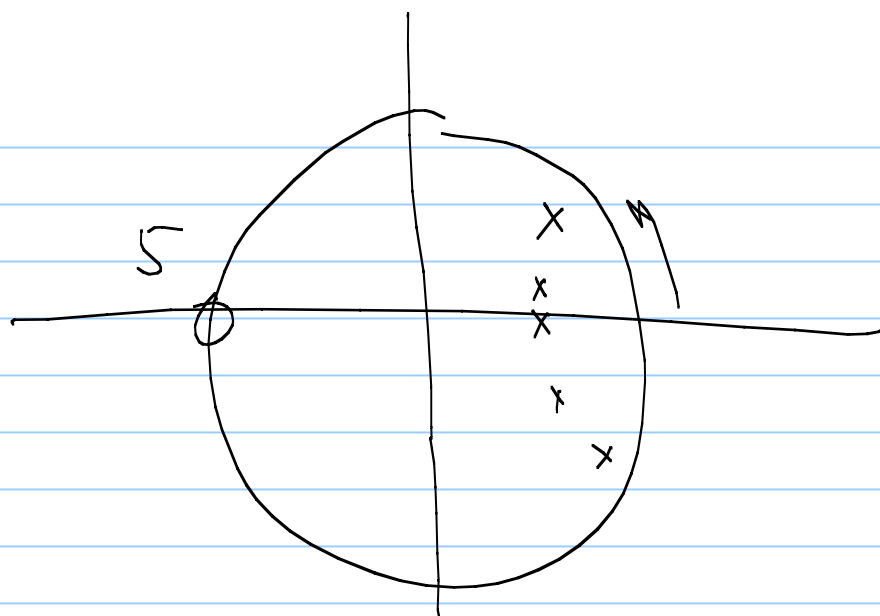


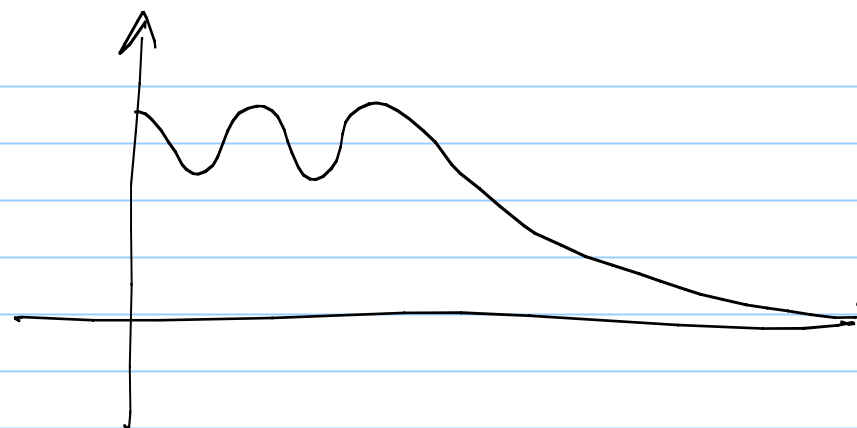
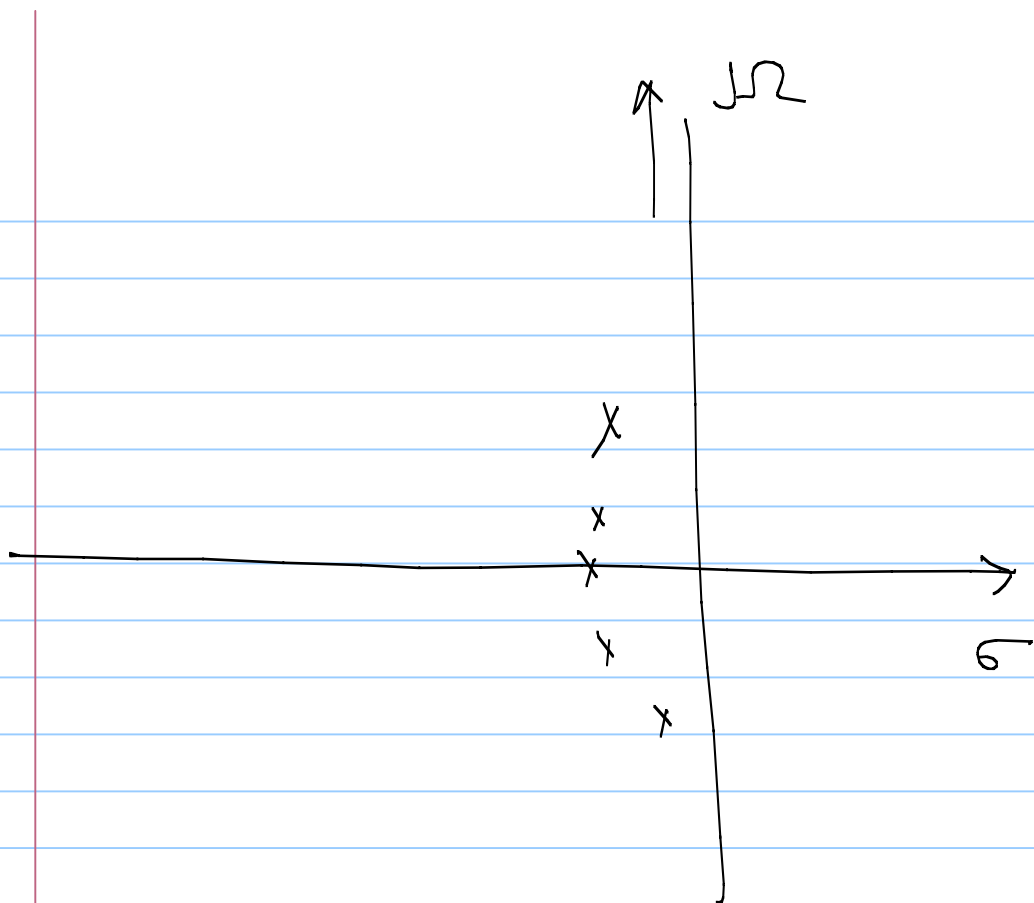
Improved notch filter:

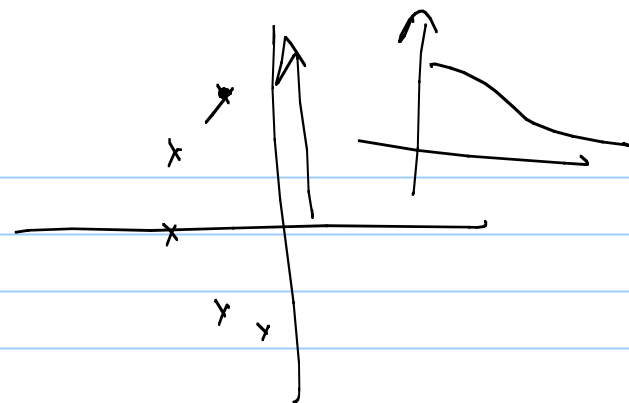
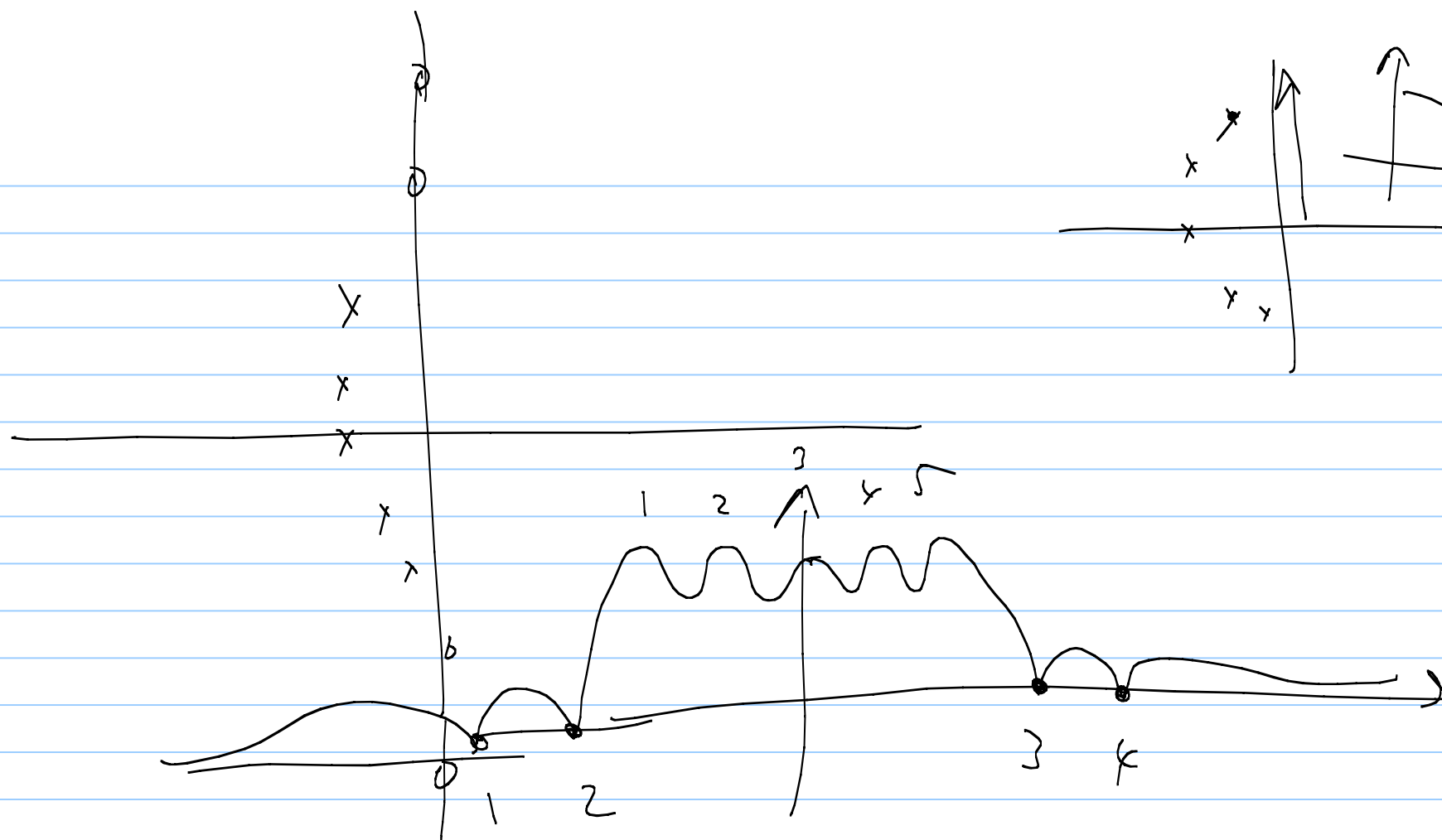
$$H(z) = \frac{1 - 2\cos\theta z^{-1} + z^{-2}}{1 - 2r\cos\theta z^{-1} + r^2 z^{-2}}$$











$$H(e^{j\omega}) = b_0 + \sum_{k=1}^M (1 - b_k e^{-j\omega}) - \sum_{k=1}^N (1 - a_k e^{-j\omega})$$

$$\tan^{-1}(3/4) \neq \tan^{-1}(-3/-4)$$

Single Complex zero

$$1/z = 1 - r e^{j\theta} z^{-1}$$

$$H(e^{j\omega}) = 1 - r e^{j\theta} e^{-j\omega}$$

$$= 1 - r e^{-j(\omega - \theta)}$$

$$= 1 - r \cos(\omega - \theta) + j r \sin(\omega - \theta)$$

$$\angle H(e^{j\omega}) = \tan^{-1} \frac{r \sin(\omega - \theta)}{1 - r \cos(\omega - \theta)}$$