27/3/15

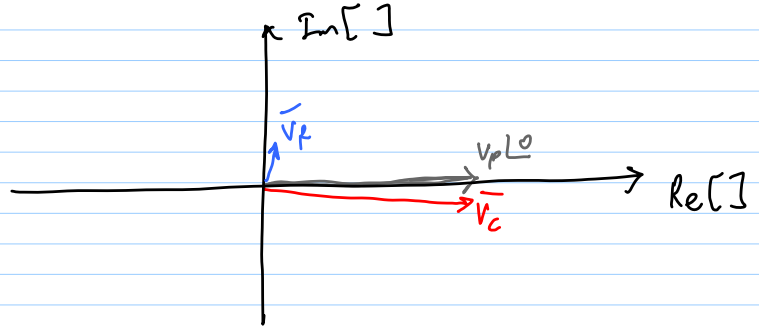
Lec 31

$$\bar{V}_R = \frac{j\omega CR}{1+j\omega CR} \cdot V_p$$

$$\bar{V}_C = \frac{1}{1+j\omega CR} \cdot V_p$$

$\omega \ll \frac{1}{RC}$

$\omega CR \ll 1$

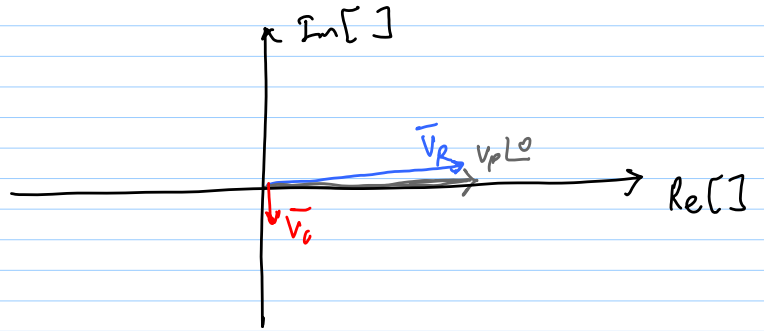


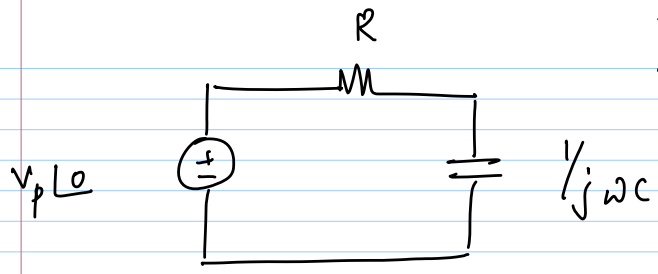
$$\bar{V}_R = \frac{j\omega CR}{1+j\omega CR} \cdot V_p$$

$$\bar{V}_C = \frac{1}{1+j\omega CR} \cdot V_p$$

$\omega \gg \frac{1}{RC}$

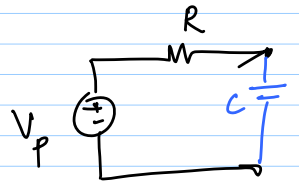
$\omega CR \gg 1$



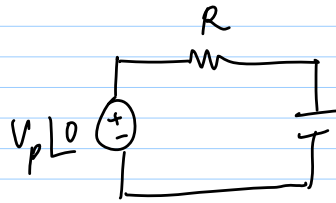


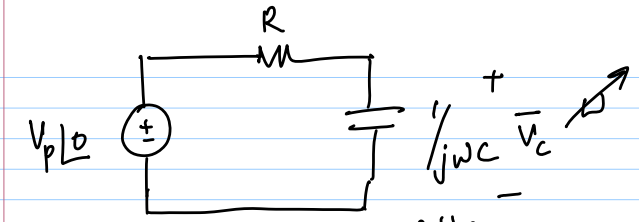
$$\bar{I}_C = j\omega C \cdot \bar{V}_C$$

@ $\omega = 0$

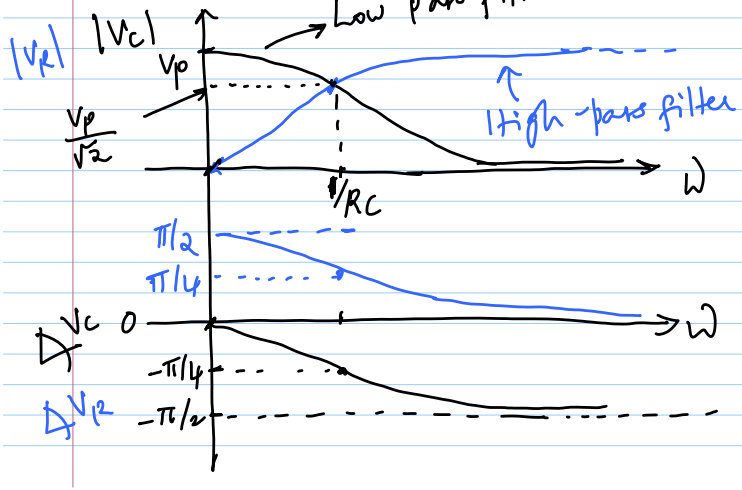


@ $\omega = \infty$





$$\bar{V}_C = \frac{1}{1+j\omega CR} V_p$$



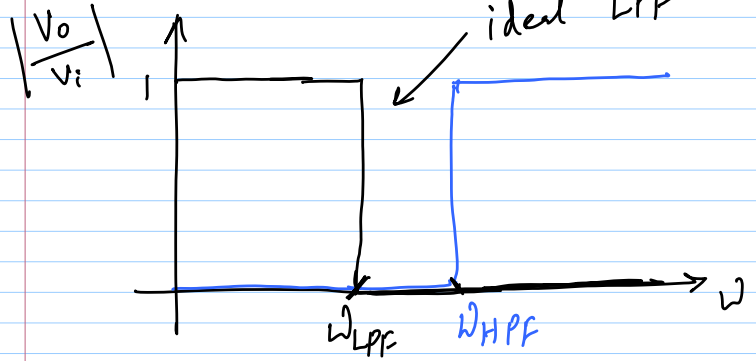
$$|\bar{V}_C| = \frac{1}{\sqrt{1+\omega^2R^2C^2}} V_p$$

$$\angle \bar{V}_C = -\tan^{-1}(\omega CR)$$

$$|\bar{V}_R| = \frac{\omega CR}{\sqrt{1+\omega^2C^2R^2}} \cdot V_p$$

$$\angle V_R = \pi/2 - \tan^{-1}(\omega CR)$$

Ideal filter



practical filter BW ≡ frequency at which output goes to $1/\sqrt{2}$ of max value