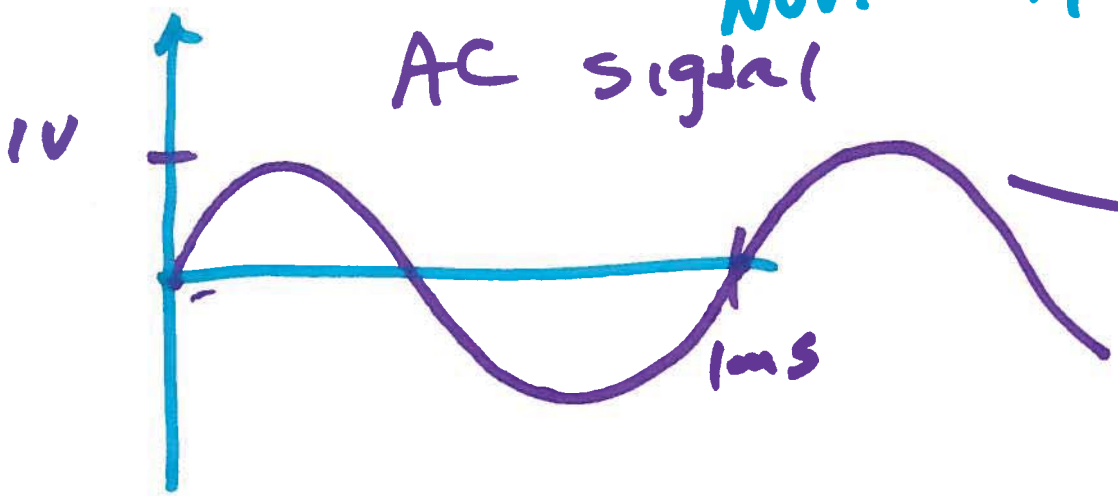
EE 220. Circuits 1

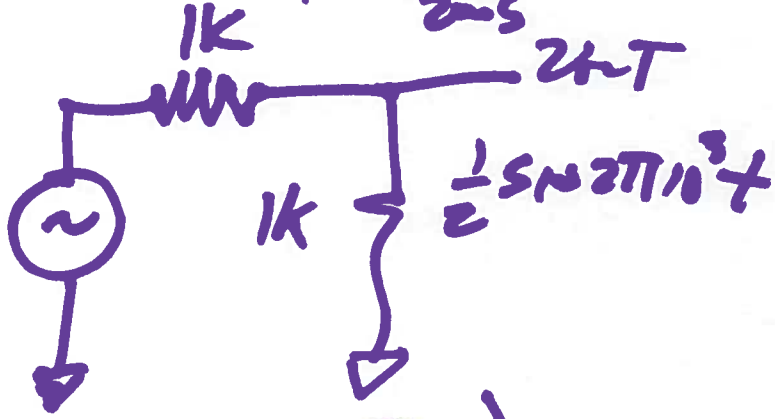
Lecture 22

NOV. 14, 2018

$f = \frac{1}{2ms} = 500Hz$

AC signal



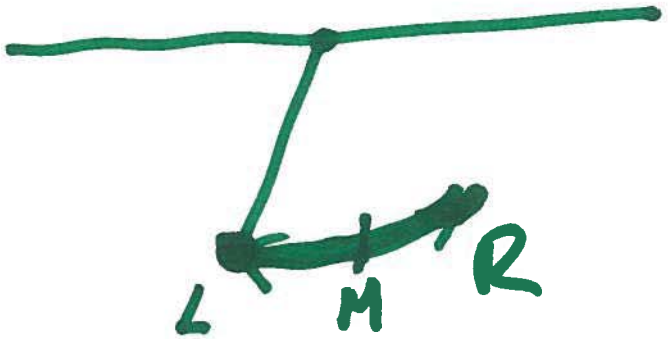


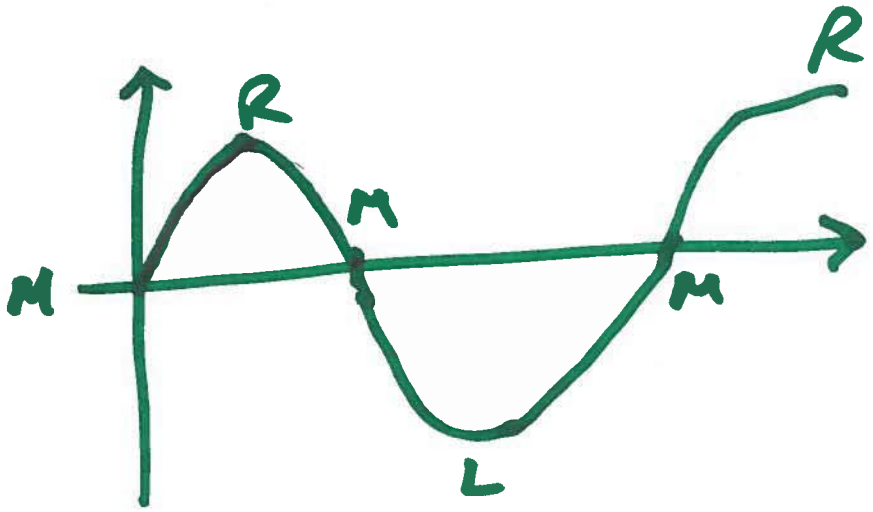
$1 \cdot \sin 2\pi \cdot 1KHz \cdot t = \sin(2\pi 10^3 t)$

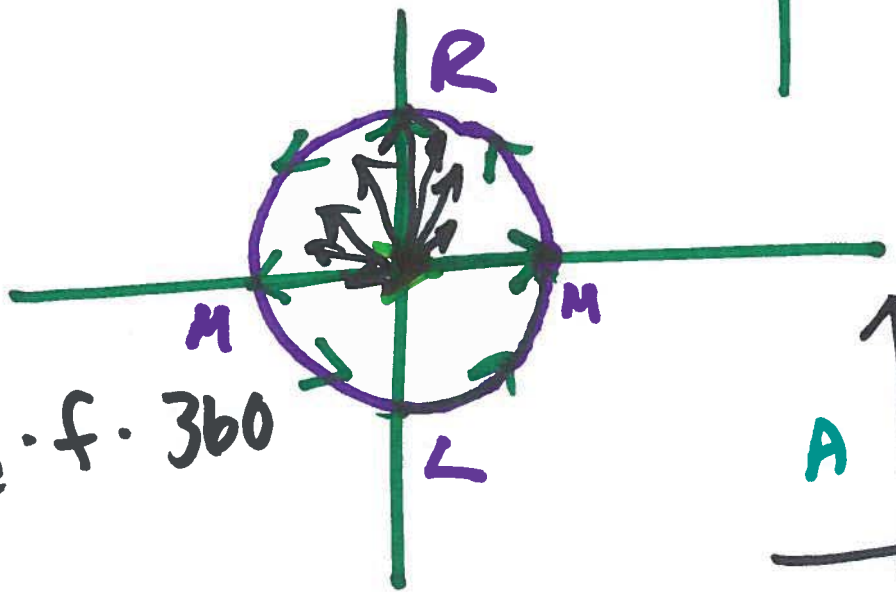
↑ peak

wrong

$\sin\left(\frac{2\pi}{360} 10^3 t + 90^\circ\right)$



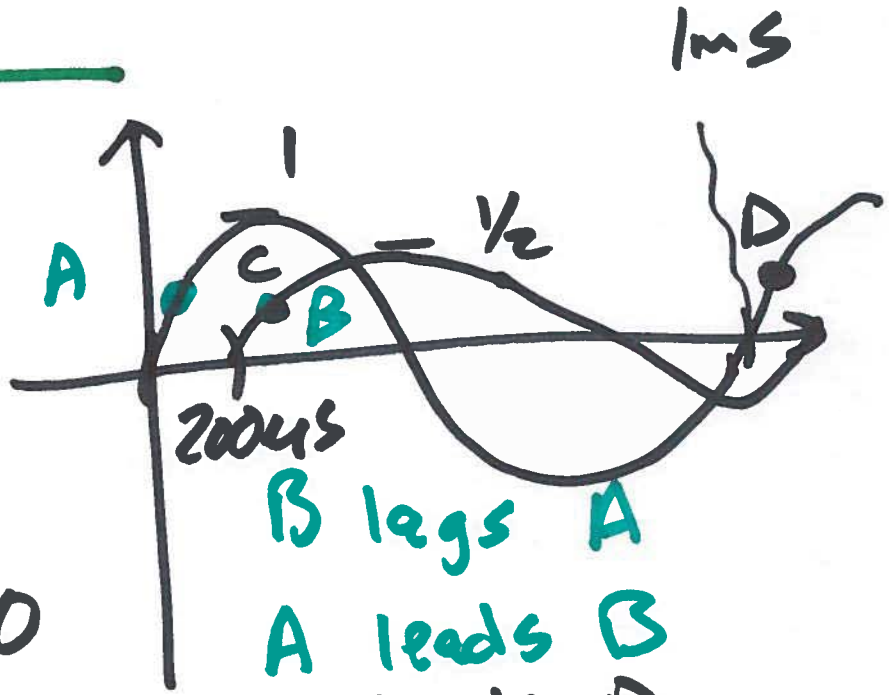




$\theta = t_d \cdot f \cdot 360$

$\theta = \frac{t_d}{T} \cdot 360$

$= \frac{200\mu s}{1ms} \cdot 360 = 72^\circ$



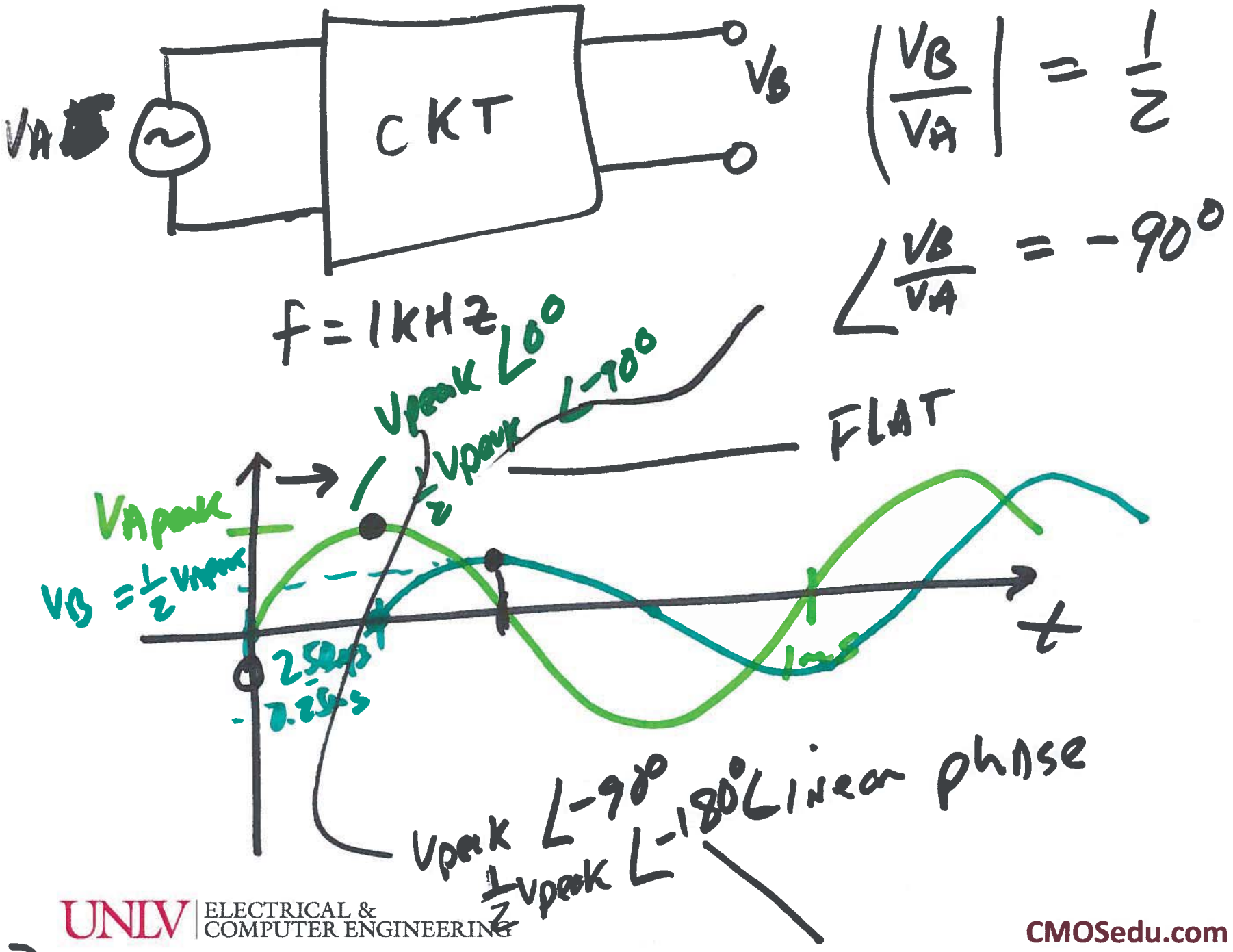
B lags A

A leads B

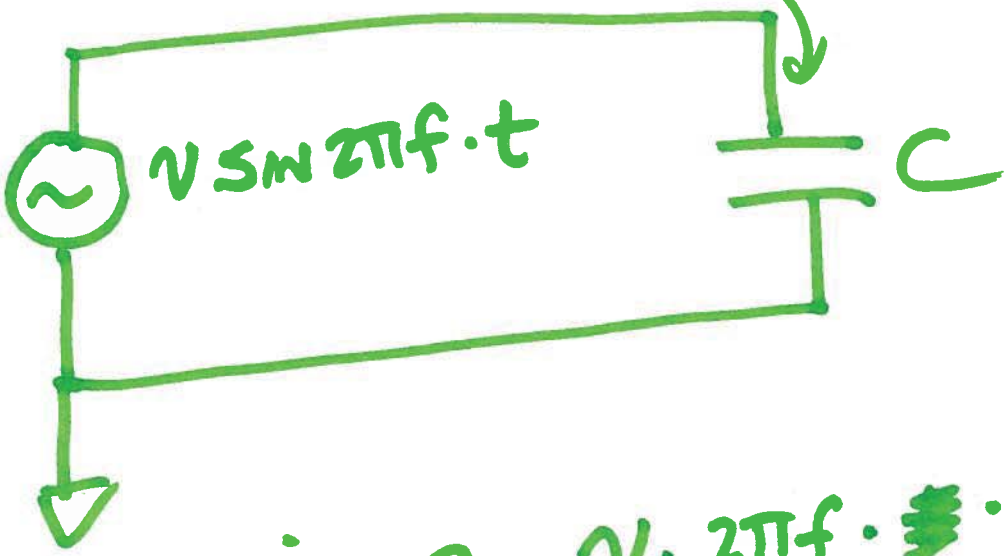
C leads D

D lags C

2)

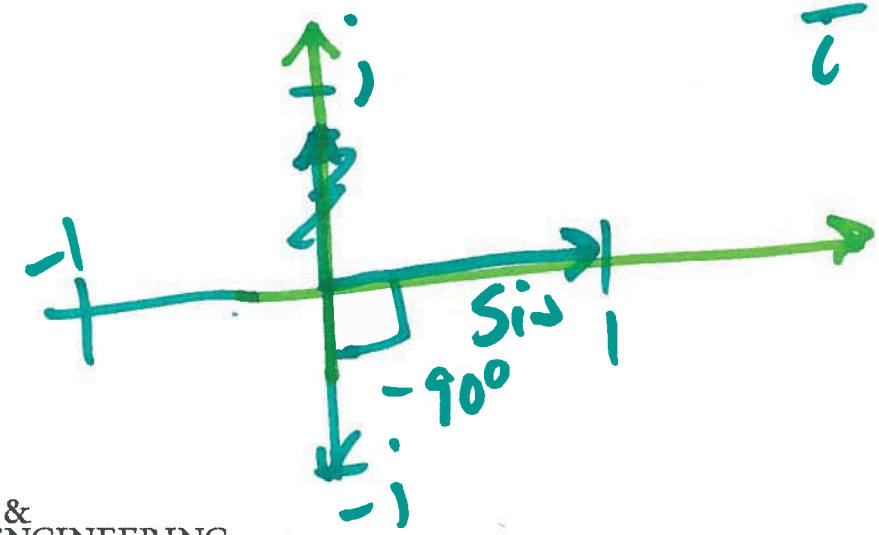

VA
CKT
VB
$\left|\frac{V_B}{V_A}\right| = \frac{1}{2}$
$\angle\frac{V_B}{V_A} = -90^\circ$
f = 1kHz
Vpeak L0°
Vpeak L-90°
FLAT
VApeak
VB = 1/2 VApeak
1/2 Vpeak
t
Vpeak L-90°
1/2 Vpeak L-180° Linear phase

AC CKT $f = \text{CONST}$



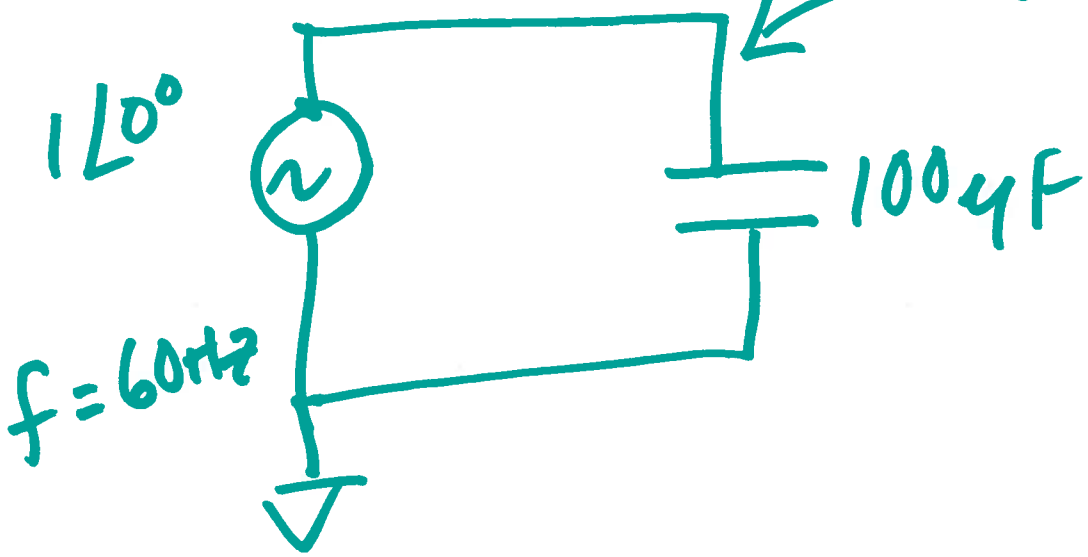
$$i = C \cdot v \cdot 2\pi f \cdot \cos 2\pi f \cdot t$$

$$\frac{v}{i} = \frac{1}{C \cdot 2\pi f} \; j$$



$$Z_c = \frac{1}{j \cdot 2\pi f \cdot C}$$

$$= \frac{-j}{2\pi f \cdot C}$$



$V_c(t) = 1\angle 0°$

$= \cos 2\pi \cdot 60 \cdot t$

$Z_C = \frac{1}{j2\pi f \cdot C}$

$= \frac{1}{j\omega C}$

$= \frac{1}{sC}$

$\frac{1}{j \cdot 2\pi \cdot 60 \cdot 10^{-4}}$

$-j \cdot 26.5$

$= 26.5\angle -90°$

$\omega = 2\pi f$

$s = j\omega$

$i = \frac{1\angle 0°}{26.5\angle -90°}$

$= \frac{1}{26.5}\angle 90°$