+5V
T

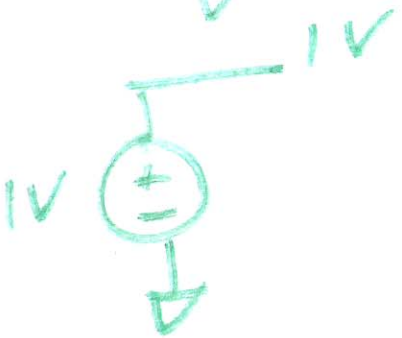
EE 320
Engineering Electronics I

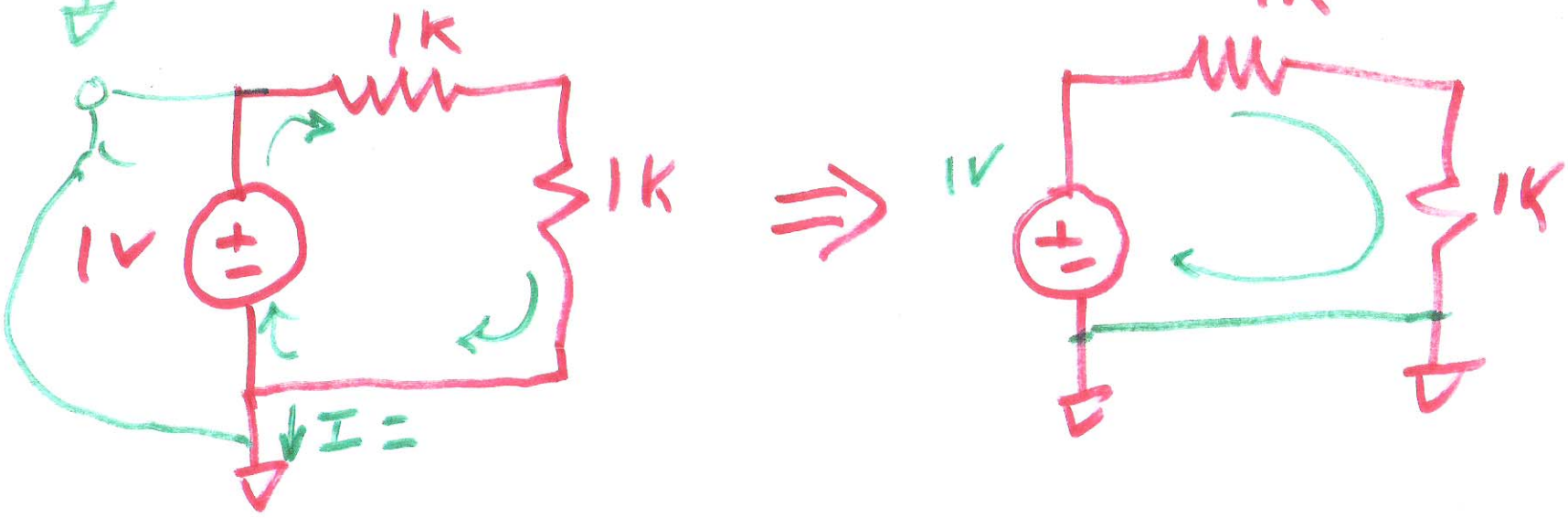
1V

1/22/14

Lecture 1

Spring 2014





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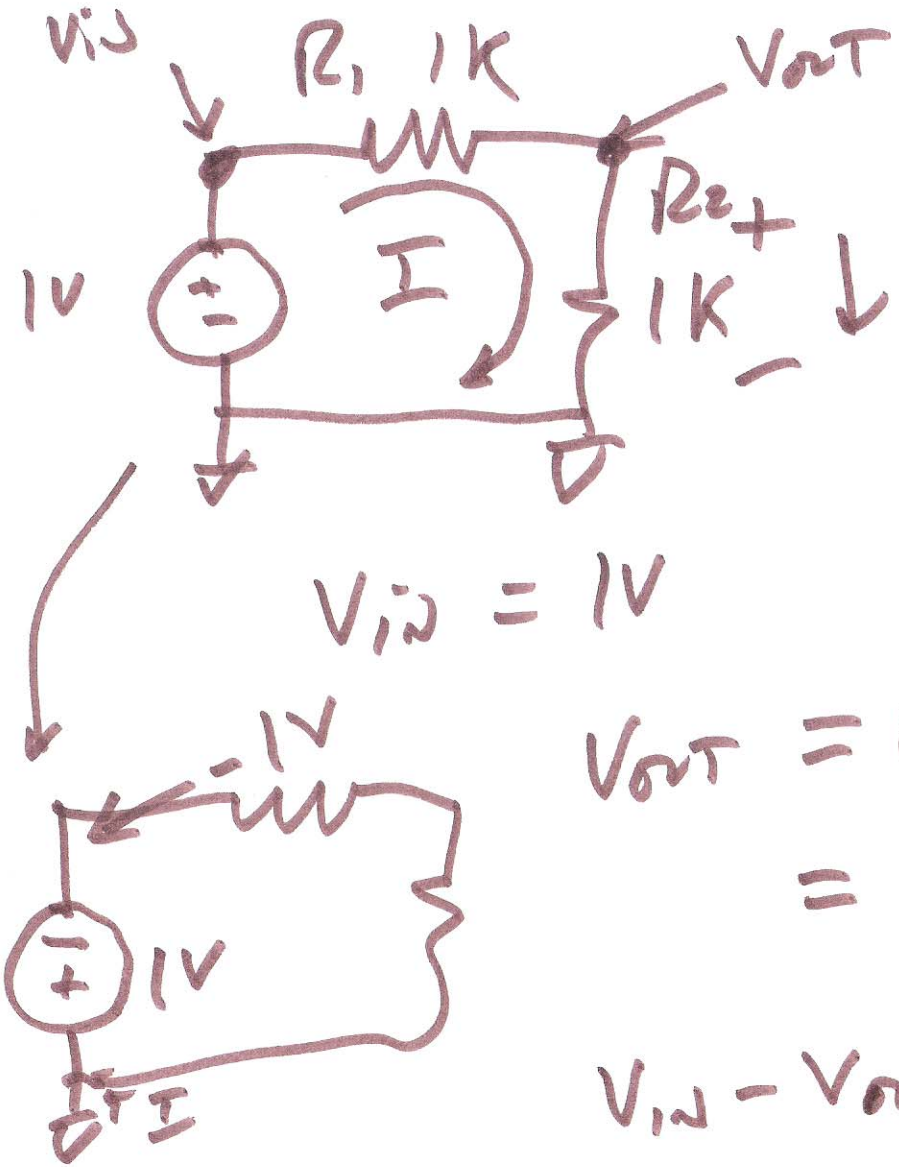


$$I = \frac{V}{R} = \frac{1V}{2K}$$

$$I = \frac{1 \cdot 10^{0}}{2 \cdot 10^{3}}$$

$$= \frac{1}{2} \cdot 10^{-3}$$

$$= \frac{1}{2} mA$$

$$= 500 \mu A$$

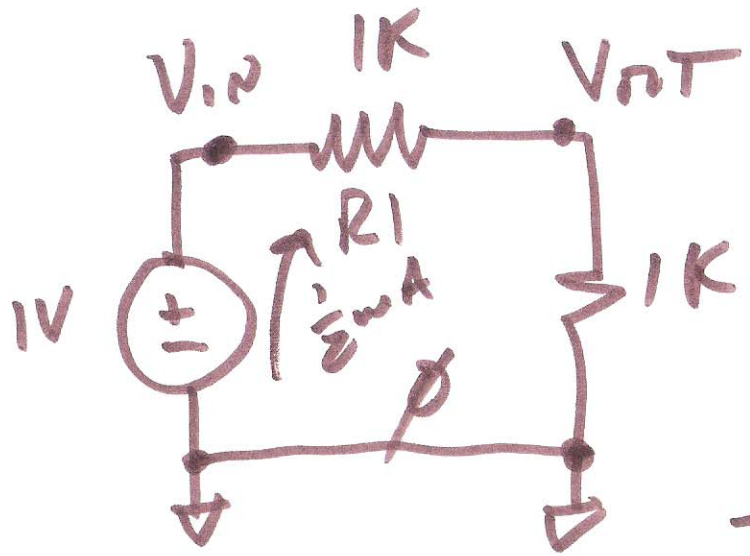
$V_{IN} = 1V$

$$V_{OUT} = 1K \cdot \frac{1}{2} mA$$

$$= \frac{1}{2} V$$

$$V_{IN} - V_{OUT} = 1 - \frac{1}{2} = \frac{1}{2}$$

$$V_{OUT} = \frac{V_{in}}{R_1 + R_2} \cdot R_2 = V_{IN} \cdot \frac{R_2}{R_1 + R_2}$$



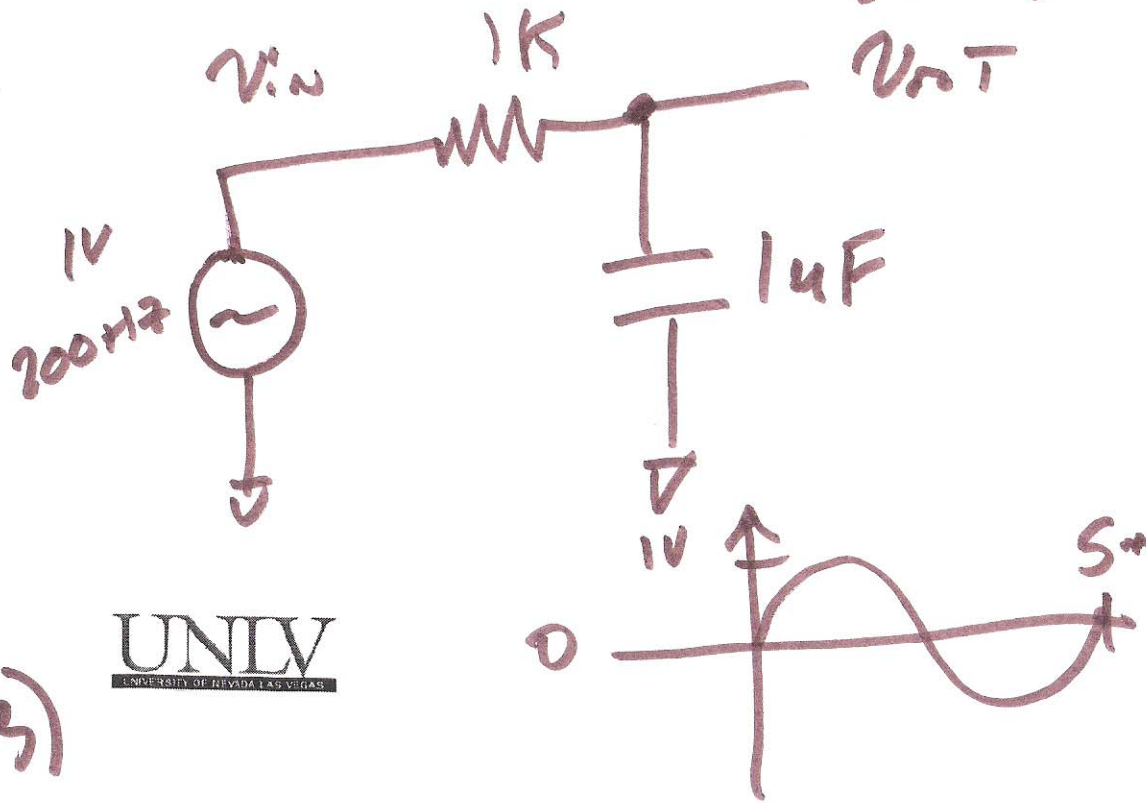
Prob. 1a H.W. #1

VIN VIN 0 DC 1
R1 VIN VOUT 1K
R2 VOUT 0 1K

$\frac{1}{10^3} = 10^{-3}$

.OP

$\frac{1}{200} = \frac{1}{\frac{1}{5} \cdot 10^3} = 5ms$

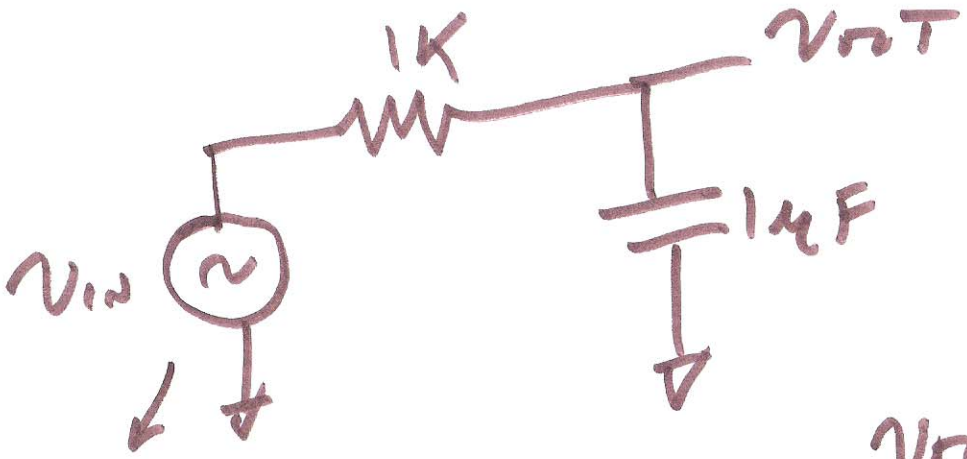


Prob 1c

RA VIN VOUT 1K
CA VOUT 0 1u
VIN VIN 0 1

SIN 0 1V 200
↑ peak ↑
.tran 20ms
offset

f. eg.



$$V_{out} = V_{in} \cdot \frac{\frac{1}{j \cdot 2\pi f \cdot 10^{-6}}}{1K + \frac{1}{j \cdot 2\pi f \cdot 10^{-6}}}$$

$$\frac{V_{out}}{V_{in}} = \frac{1}{1 + j 2\pi f \cdot 10^{-3}}$$

$V_p = 1V, 2$

$f = 200$

$|a + jb|$

$\sqrt{a^2 + b^2}$

3.14
$\cdot\cdot 4$
1.256

1.2
$\cdot 4$
1.6

$\tan^{-1} \frac{b}{a}$

$$V_{out} = \frac{1}{1 + j \cdot 2\pi \cdot 200 \cdot 10^{-3}}$$

$$= \frac{1}{1 + j 0.4\pi}$$

$$V_{out} = \frac{1}{1 + j 1.26}$$

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4)

$$\left|\frac{V_{out}}{V_{in}}\right| = \frac{1}{\sqrt{1^2+(1.26)^2}} = .62$$

$$\angle\frac{V_{out}}{V_{in}} = -\tan^{-1} 1.26 = -.9 \cdot \frac{360}{2\pi}$$

$$= -51.56$$

$$|\Delta t| \cdot \theta = \frac{\Delta t}{T} \cdot 360 = f \cdot \Delta t \cdot 360$$

$$51.56 = \frac{\Delta t}{5ms} \cdot 360$$

$$\frac{1}{7} \cdot 5ms = \Delta t \approx 700\mu s$$

5)