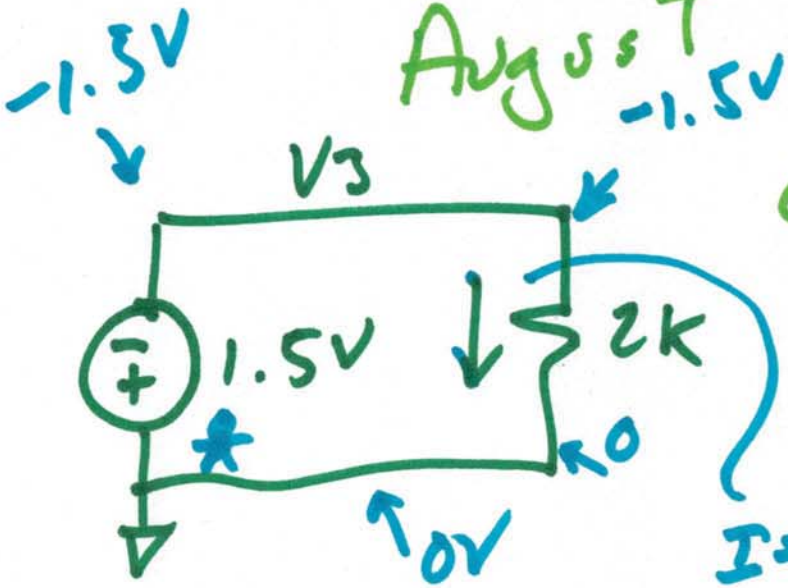
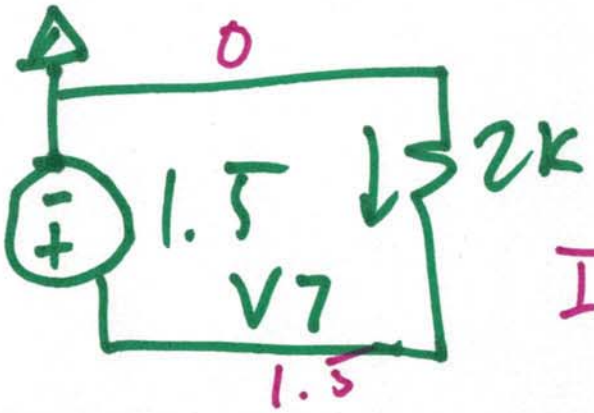
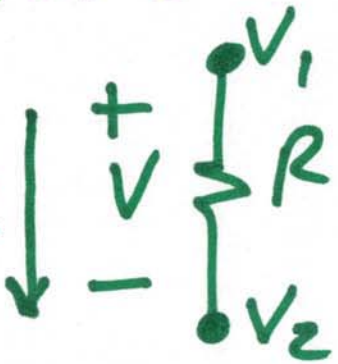
EE 220
Circuits 1
August 29, 2018
Lecture 2



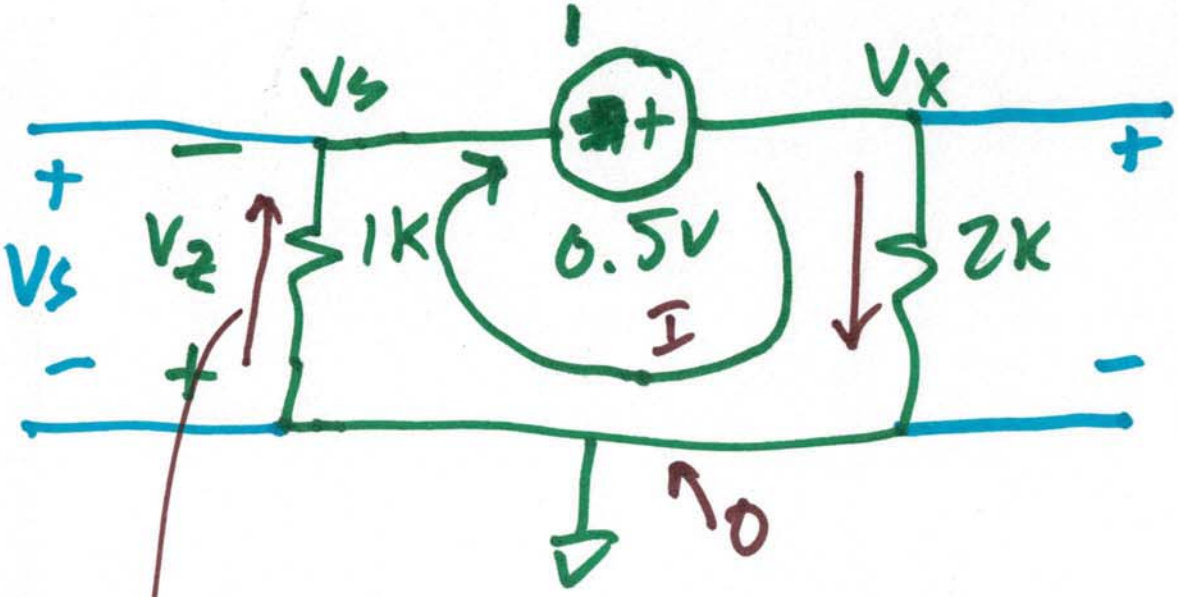




$I = \frac{-1.5-0}{2K} = -750\mu A$

$I = \frac{V_1 - V_2}{R}$

$I = \frac{0-1.5}{2K} = -750\mu A$



$V_z = 0 - V_s = -V_s$

$I = \frac{0 - V_s}{1K} = \frac{-V_s}{1K}$

$V_x = .166mA \cdot 2K = 333mV$

$V_s = -167mV = -.166mA \cdot 1K$

$0.5 = V_x - V_s$

$I = \frac{V_x - 0}{2K}$

$V_x = I \cdot 2K$

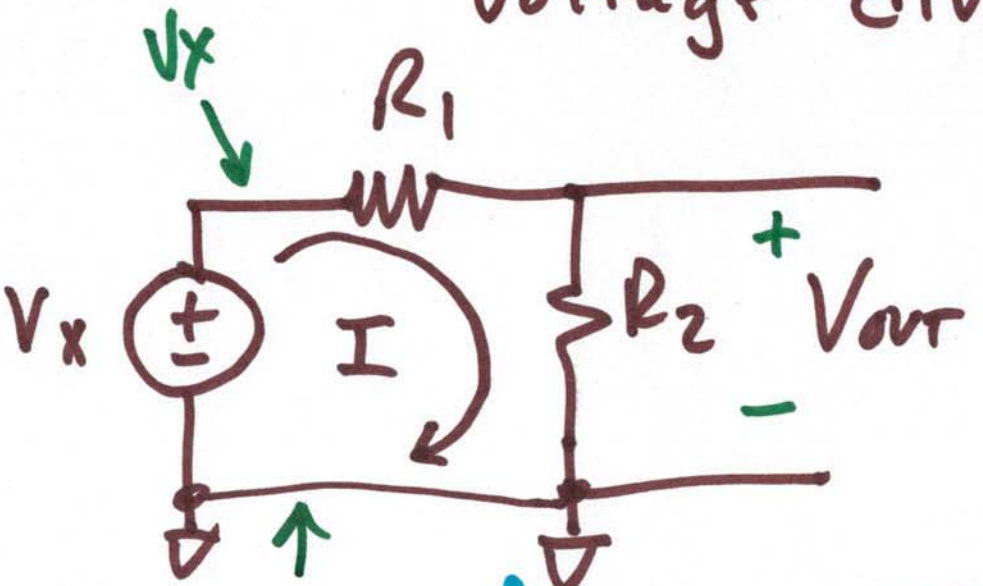
$V_s = -I \cdot 1K$

$0.5 = I \cdot 2K - (-I \cdot 1K)$

$I = \frac{0.5}{3K} = \frac{1}{6}mA$

$= .1667mA$

Voltage divider

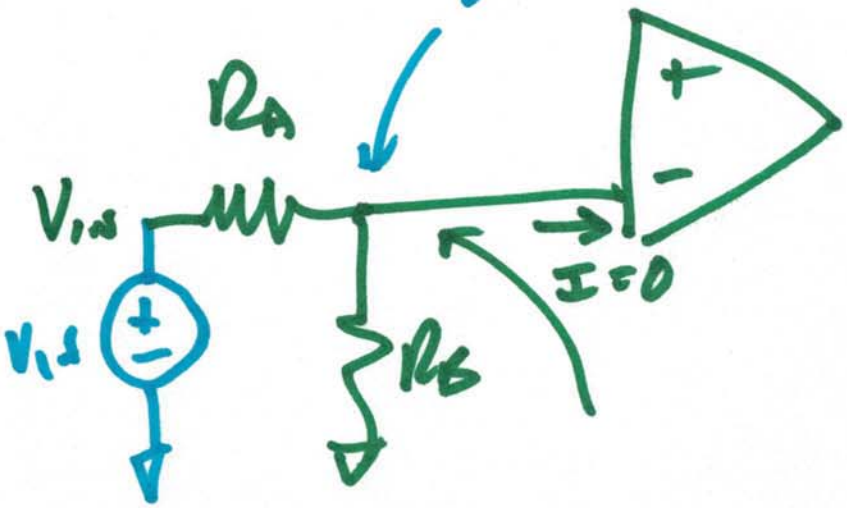


$$I = \frac{V_X - 0}{R_1 + R_2}$$

$$V_{OUT} = I \cdot R_2$$

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

Voltage divider EQUATION



Resistors in Series

$$B = \frac{X_1 \cdot X_2}{X_1 + X_2}$$

$$\frac{1\,pal}{20 X_1} + \frac{1\,pal}{10 X_2} = \frac{1}{B}$$

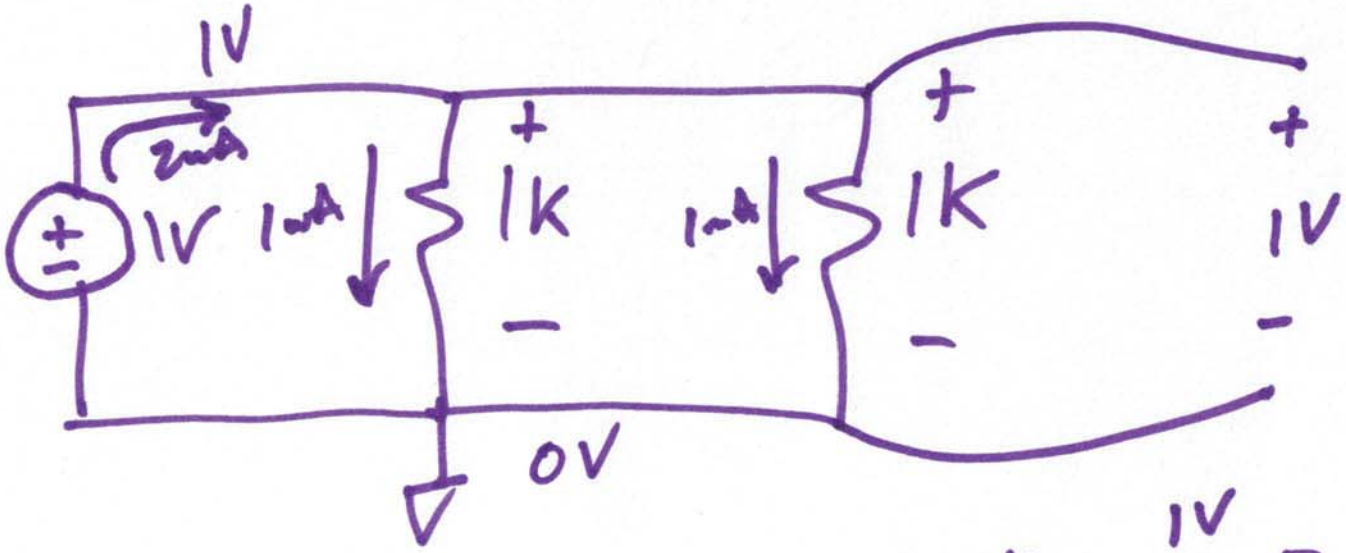
$$\frac{1+2}{20} = \frac{1}{B}$$

$$B = \frac{20}{3} = 6.67\ \text{Hrs}$$

$$R = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

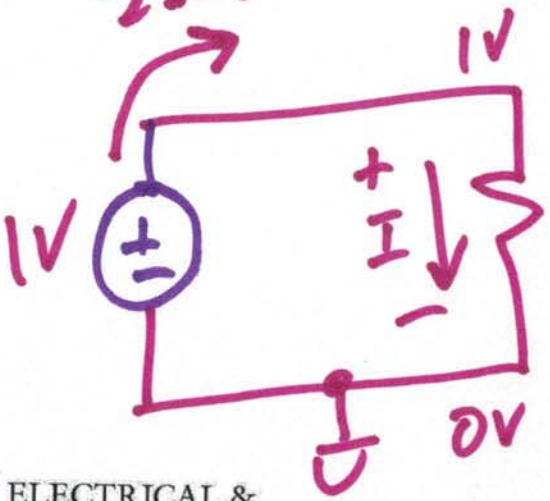
$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$



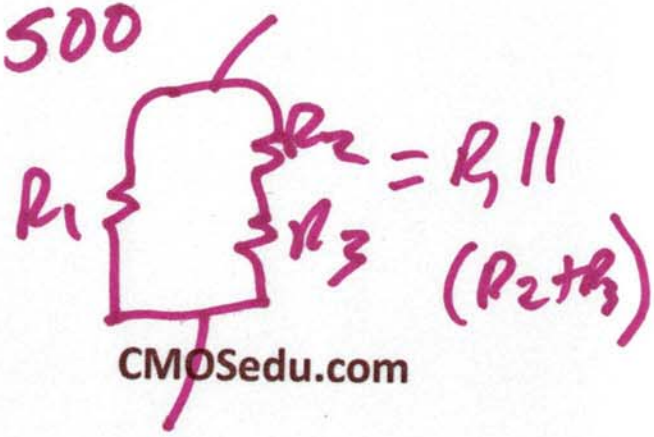
$$\frac{R_1 \cdot R_2}{R_1 + R_2} = R_{EQ} = 1K \| 1K = \frac{1K \cdot 1K}{1K + 1K}$$

$$= 500\Omega$$

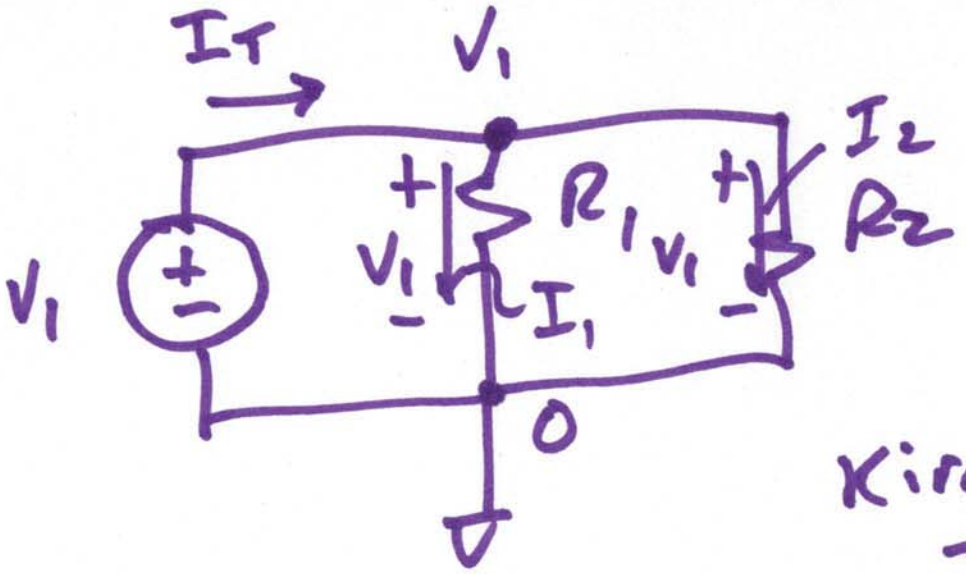
$$\frac{1V}{1K} = 1mA$$



$$I = \frac{1-0}{500} = 2mA$$



CURRENT divider



$$I_1 = \frac{V_1 - 0}{R_1}$$

$$I_2 = \frac{V_1 - 0}{R_2}$$

Kirchoff's current law

$$I_T = I_1 + I_2$$

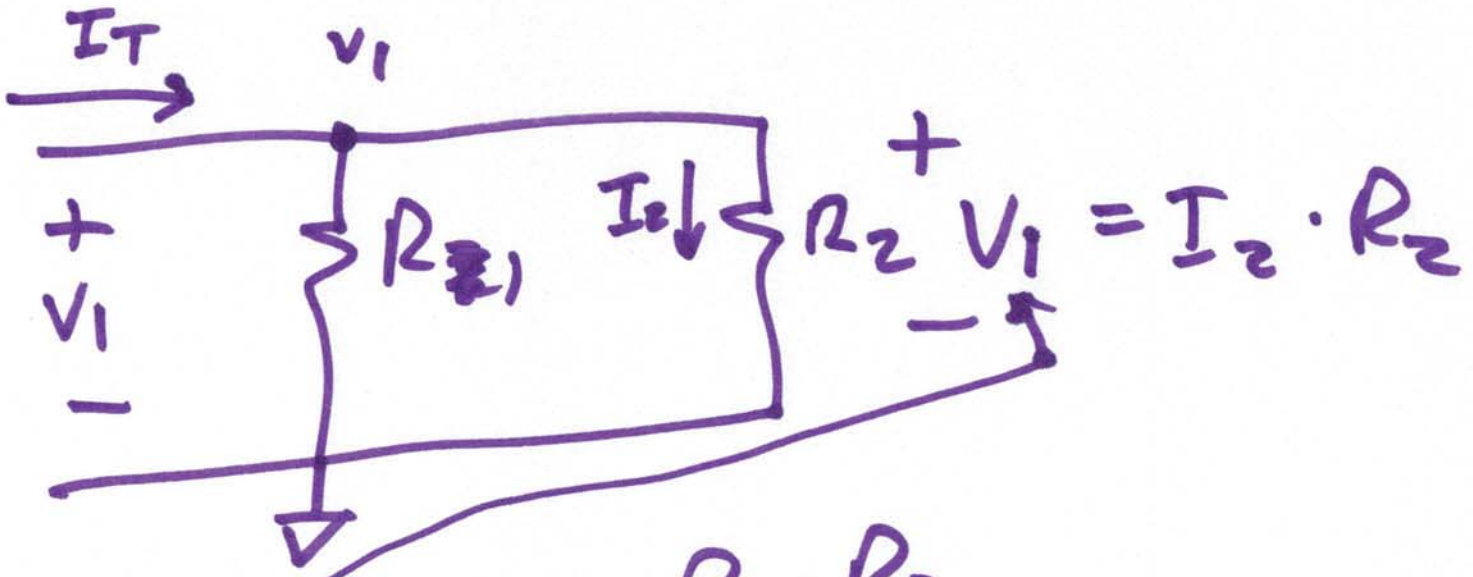
$$I_2 = I_T - I_1$$

$$= \frac{V_1}{R_1 \,||\, R_2}$$

$$\frac{V_1}{R_2} = \frac{V_1}{R_1 || R_2} - \frac{V_1}{R_1}$$

$$R_1 || R_2 = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

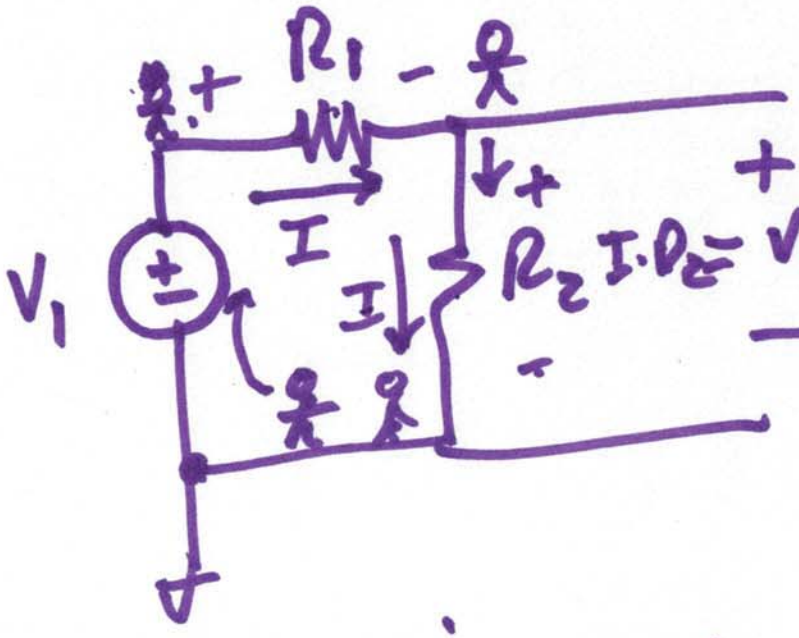
$$I_2 = I_T \cdot \frac{R_1}{R_1 + R_2}$$



$$V_1 = I_T \cdot \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$I_2 = I_T \cdot \frac{R_1}{R_1 + R_2}$$

current divider



$$V_2 = V_1 \cdot \frac{R_2}{R_1+R_2}$$

Kirchoff's voltage law (KVL)

$$V_1 - I \cdot R_1 - I \cdot R_2 = 0$$

$$V_1 = I \cdot (R_1+R_2)$$

$$V_2 = I \cdot R_2$$

$$V_2 = V_1 \cdot \frac{R_2}{R_1+R_2}$$