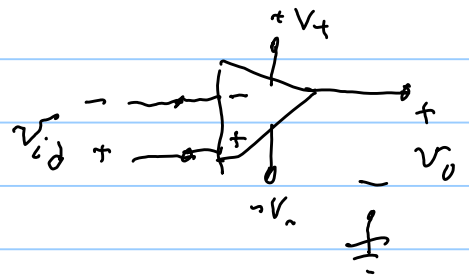
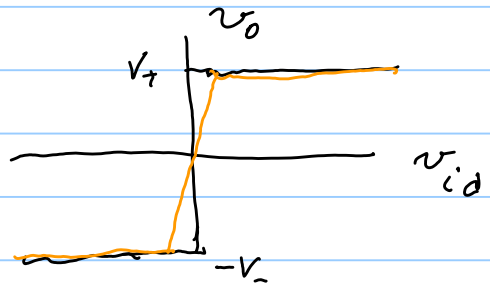
02/05/18
EE 307

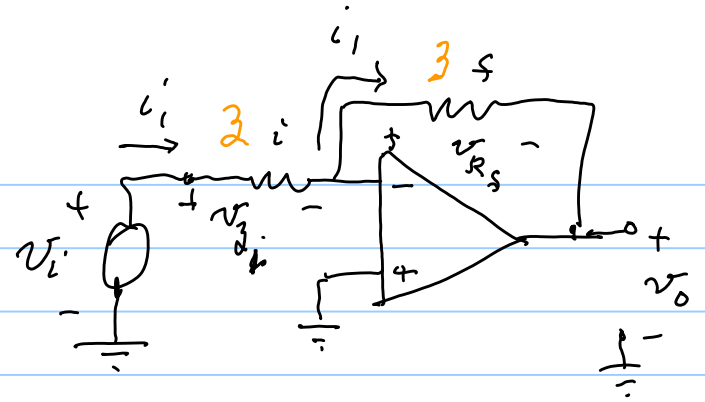
Note Title 2/5/2018





nullator
$v = 0, i = 0$

norator
v = arbitrary
i = arbitrary & independent of v



$$\frac{v_o}{v_i}(a) = -\frac{Z_f}{Z_i}$$

$$v_{Z_i} = Z_i \cdot i_1 \quad ; \quad v_{R_f} = Z_f \cdot i_1 = Z_f \cdot \frac{v_i}{Z_i} = -v_o$$

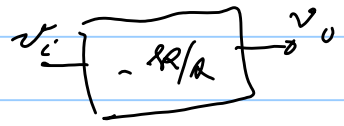
$$= v_i$$

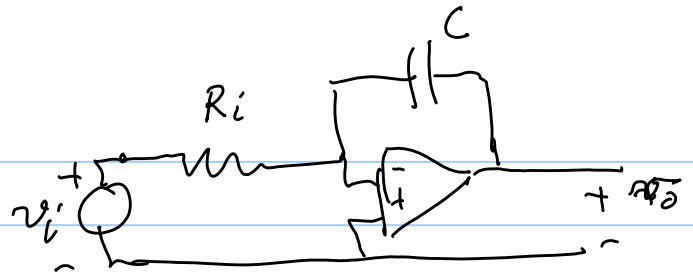
$$\Rightarrow i_1 = v_i / Z_i$$

if desire an integrator $= kR/R = v_o/v_i = -\frac{kL}{LR} = -\frac{kR}{L}$

$R = kL$

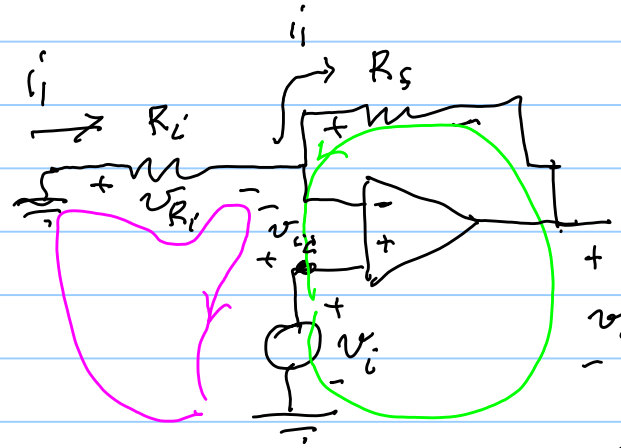
$\Rightarrow$





$$\frac{v_o}{v_i} = -\frac{1/Cs}{R_i} = -\frac{1}{R_i C s}$$

for a positive multiplier



$$i_1 = -v_i / R_i$$

$$v_{R_i} = R_i i_1 = v_{i_d} = -v_i$$

$$v_{i_d} = 0$$

$$v_o = -R_f i_1 + v_i = +R_f \frac{v_i}{R_i} + v_i$$

$$v_o = \left(1 + \frac{R_f}{R_i}\right) v_i \Rightarrow \frac{v_o}{v_i} = 1 + \frac{Z_f}{Z_i}$$

KVL $\Rightarrow$ $0 = v_i - v_o - R_f i_1 - v_{i_d}$ $\Rightarrow$ $v_o = v_i - R_f i_1$, ; $0 = v_i + v_{R_i}$

$v_{i_d} = 0$

$v_o = v_i - R_f(-v_i/R_i) = (1 + R_f/R_i) v_i$

$i_1 = -v_i/R_i \Leftarrow = v_i + R_i i_1$

Rectifier