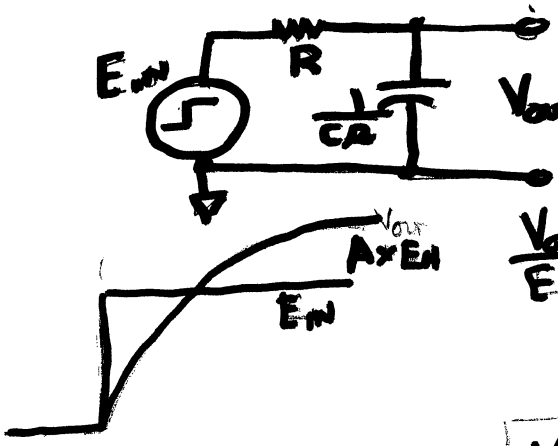


$$V_{OUT} = \frac{E_{IN} \frac{1}{CA}}{R + \frac{1}{CA}}$$

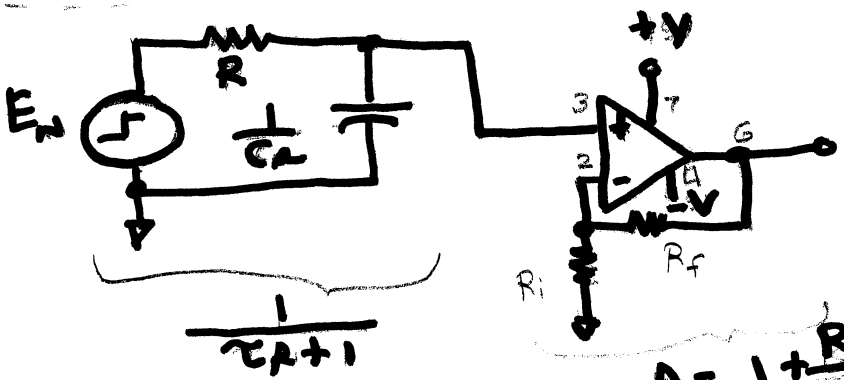
Voltage divider rule

$$\frac{V_{OUT}}{E_{IN}} = \frac{\frac{1}{CA}}{R + \frac{1}{CA}} \cdot \frac{CA}{CA}$$

$\times$ Gain function

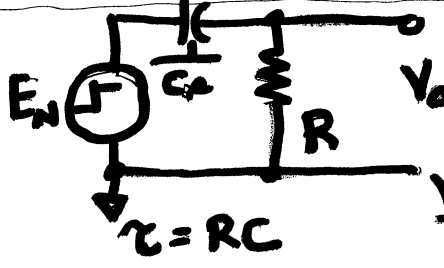
$$= \frac{1}{RCA + 1} \qquad \tau = RC$$

$$\boxed{\frac{V_{OUT}}{E_{IN}} = \frac{1}{\tau A + 1}}$$



$$A = 1 + \frac{R_f}{R_i}$$

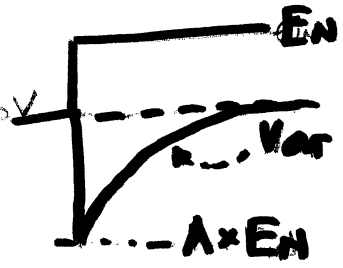
$$\frac{V_{OUT}}{E_{IN}} = A \times \frac{1}{\tau A + 1}$$

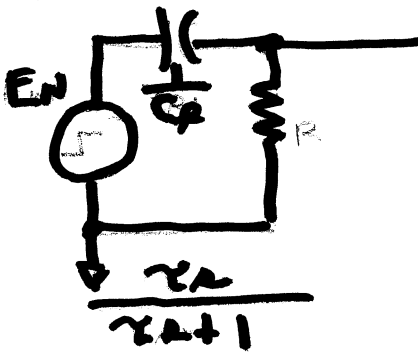


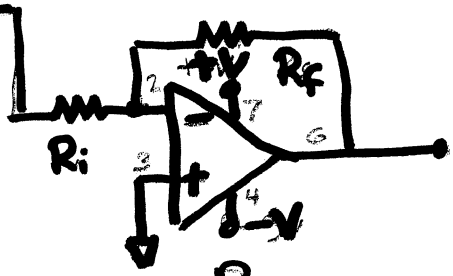
$$V_{OUT} = E_{IN} \times \frac{R}{R + \frac{1}{CA}} \cdot \frac{CA}{CA}$$

$$\tau = RC$$

$$\frac{V_{OUT}}{E_{IN}} = \frac{RCA}{RCA + 1} = \boxed{\frac{\tau A}{\tau A + 1}}$$







$$A = \frac{R_f}{R_i}$$

$$R_i >> R$$

$$\frac{V_{OUT}}{E_{IN}} = -A \frac{\tau A}{\tau A + 1}$$