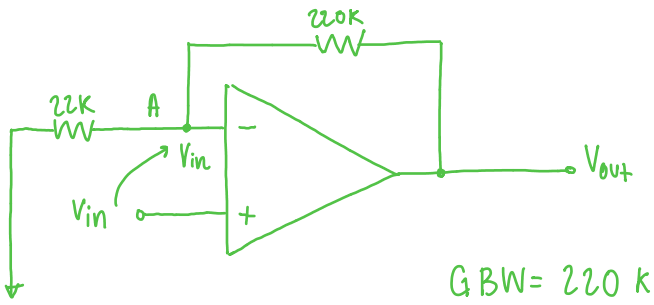
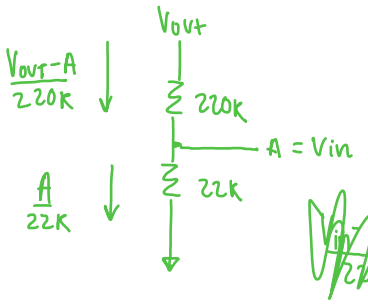
Prelab 7

Thursday, October 3, 2024 06:33



GBW = 220 kHz = Gain · bandwidth



$Gain = \frac{V_{out}}{V_{in}}$

↔ Same circuit as last time

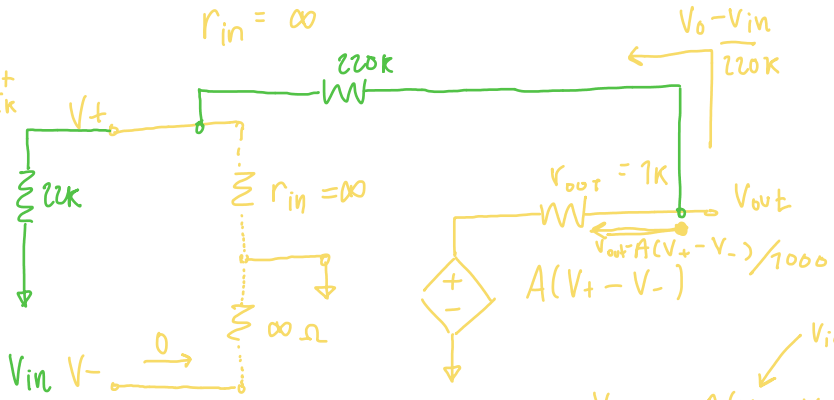
Gain = 10

220KHz / 10 → 22KHz bandwidth

Open loop Gain : 30dB

$r_{out} = 1K$

$r_{in} = \infty$



$$\frac{V_{out} - A(V_+ - V_-)}{1K} - \frac{V_{out} - V_+}{220K} = 0$$

(V_{in})

30 dB → 31.6 $\{10^{3/20}\}$

$$\frac{V_+}{22K} + \frac{V_+ - V_{out}}{220K} = 0$$

$$V^+\left(\frac{1}{22K} + \frac{1}{220K}\right) - V_{out}\left(\frac{1}{220K}\right) = 0$$

(multiply by 220K)

$$V^+\left(\frac{220K}{22K} + \frac{220K}{220K}\right) - V_{out} = 0$$

$= V_{out}$

$$V_{out}\left(\frac{1}{1K} - \frac{1}{220K}\right) - \frac{A(V_-)}{1K} + V_+\left(\frac{A}{1K} - \frac{1}{220K}\right) = 0$$

(A = 31.6)

↓ algebra calc + plug values

3.8 $V_{out} = 31.62\ V_-$

$V_{out} = 8.15\ V_-$ or $8.15\ V_{in}$