

Pontificia universidad Javeriana de Cali.



Electrónica Analógica

Laboratorio #2

Ingeniería Biomédica.

Maestro:

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Participantes:

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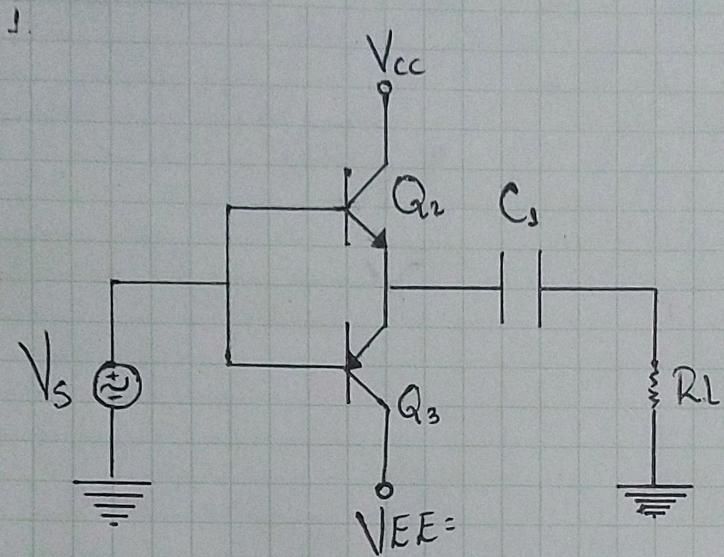
José Luis Mazuera Cárdenas.

Cali-Valle del Cauca.

Marzo del 2021.



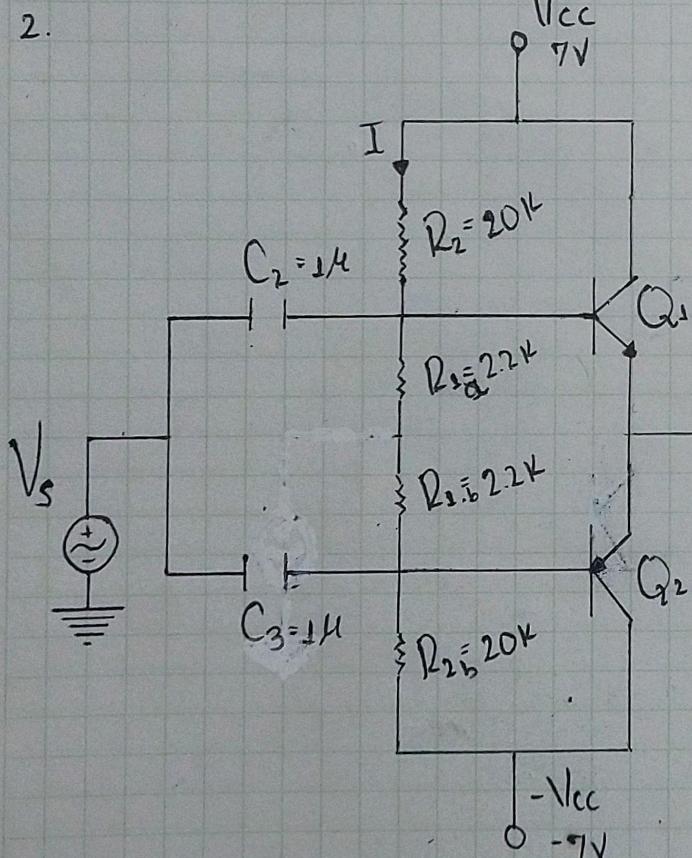
LABORATORIO # 2



$$\rightarrow P_L = 200 \text{ mW}$$

$$P_L = \frac{V_{CC}^2}{2R_L}$$

$$V_{CC} = \sqrt{2R_L P_L} = 6,32 \text{ V}$$

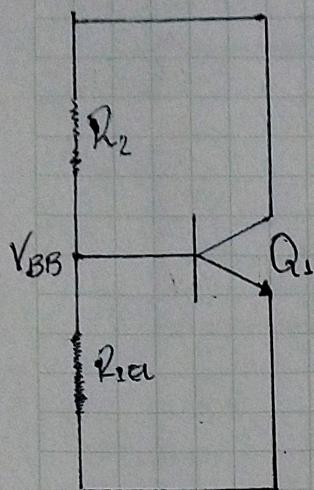
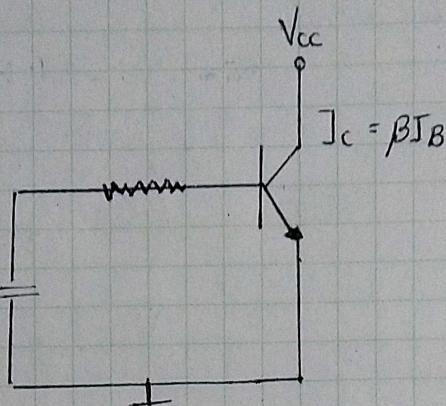


$$\beta = 100$$

$$V_{BE} = 0.7$$



ANALISIS PC

 \Rightarrow 

$$V_{BB} = \frac{V_{CC} \cdot R_{1,a}}{R_{1,a} + R_2} = 0,75V$$

$$R_B = \frac{(R_{1,a} \parallel R_2)}{(R_{1,a} \parallel R_2)} =$$

$$R_B = \frac{(2,2k \parallel 20k)}{(2,2k \parallel 20k)} = 1,98k\Omega$$

L V K malla interna.

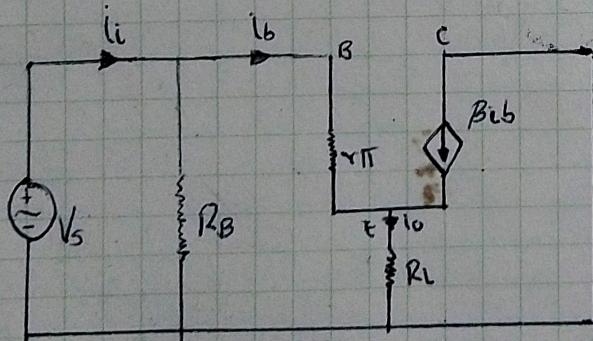
$$V_{BB} = \frac{I_C}{\beta} R_B + V_{BE} \Rightarrow I_{CQ} = \frac{V_{BB} - V_{BE}}{R_B}$$

$$I_{CQ} = \frac{0,75 - 0,7}{1,98} = 0mA$$

L V K malla salida

$$V_{CC} = V_{CE} = V_{CEQ}$$

ANALISIS AC





$$\cdot i_{\text{max}} = \frac{V_{cc}}{R_L} \rightarrow I_{DC} = \frac{i_{\text{max}}}{\pi} ; \quad I_{DC} = \frac{V_{cc}}{R_L \pi} = 22,28 \text{ mA}$$

$$r\pi = \frac{\beta \cdot 26 \text{ mV}}{I_{DC}} = \frac{100 \cdot 26 \text{ mV}}{22,28} = 233,4 \Omega$$

$$\Rightarrow A_V = \frac{V_o}{V_s} \quad \circ V_o = (i_b + \beta i_b) R_L = i_b R_L (\pi + \beta)$$

$$\cdot i_b = \frac{V_s - V_o}{r\pi} \Rightarrow V_s = i_b r\pi + V_o \Rightarrow V_s = i_b r\pi + \beta i_b R_L$$

$$V_s = i_b (r\pi + \beta R_L)$$

$$A_V = \frac{i_b R_L (\pi + \beta)}{i_b (r\pi + \beta R_L)} = \frac{100 (\pi + 100)}{(233,4 + 100 \cdot 100)} = 0,99 \approx 1$$

$$\Rightarrow A_i = \frac{i_o}{i_i} \quad \cdot i_o = \frac{V_o}{R_L} = i_b (\pi + \beta) \approx i_b \beta$$

$$\cdot V_i \approx V_o \rightarrow (i_i - i_b) R_B \approx i_b R_L (\pi + \beta)$$

$$R_B i_i - i_b R_B \approx i_b R_L \beta$$

$$i_b = \frac{i_i R_B}{\beta R_E + R_B}$$

$$A_i = \frac{i_o}{i_i} = \frac{\beta R_L}{\beta R_E + R_B} = \frac{100 \cdot 1,98}{100 \cdot 100 + 1,98} = 18,02$$

$$Z_{\text{out}} = \frac{r\pi}{\beta} = 1,167 \Omega$$

$$Z_{\text{in}} = (r\pi + \beta R_L) \parallel R_B = (233,4 + 100 \cdot 100) \parallel 1,98 = 1803,5 \Omega$$

$$\bullet P_L = \frac{V_{cc}^2}{2 R_L} = \frac{7^2}{2 \cdot 100} = 0,245 \text{ W}$$

$$\bullet P_{DCT} = \frac{2 V_{cc}^2}{\pi R_L} = \frac{2 \cdot 7^2}{233,4 \cdot 100} = 0,312 \text{ W}$$

$$\eta \% = \frac{P_L}{P_{DCT}} \times 100 = \frac{0,245}{0,312} \times 100 = 78,54 \%$$

$$\bullet i_{\text{omax}} = i_{\text{cmax}} = 0,07 \text{ mA}$$

$$\bullet V_{o\text{max}} = R_L i_{\text{omax}} = V_{cc} = 7 \text{ V}$$

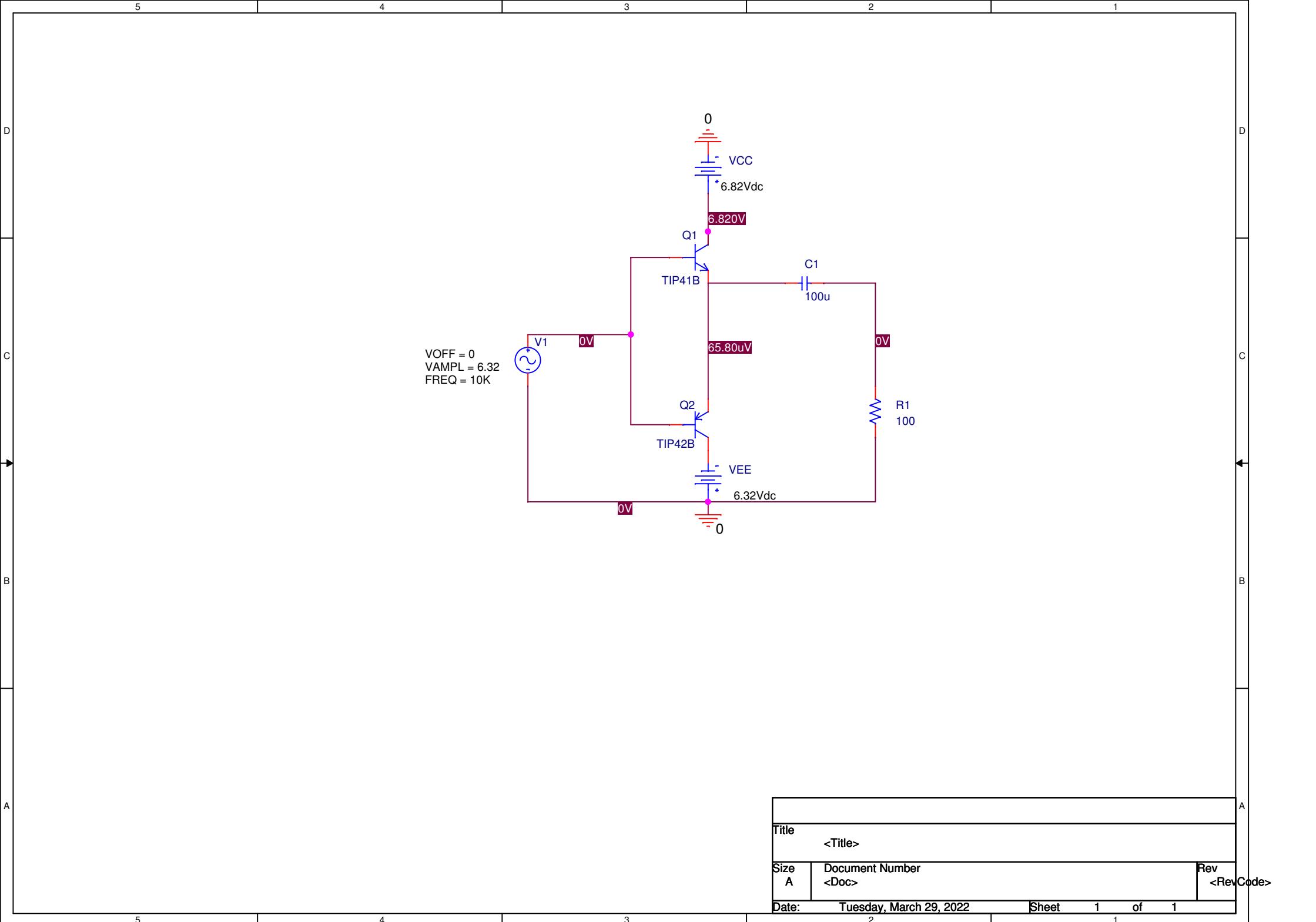
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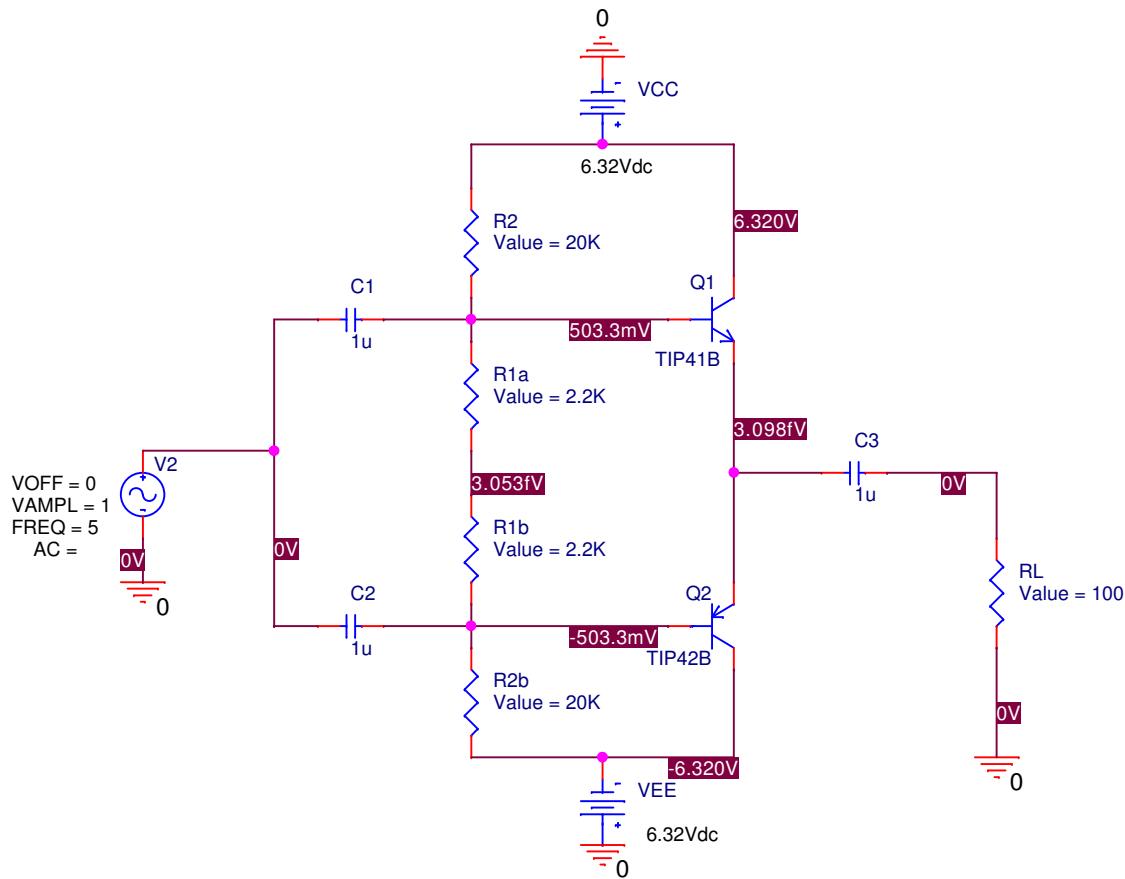
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Año

$$i_{imax} = \frac{I_{0max}}{A_i} = \frac{0,07}{18,02} = 3,8 \text{ mA}$$

$$V_{imax} = \frac{V_{0max}}{1} = 7 \text{ V}$$



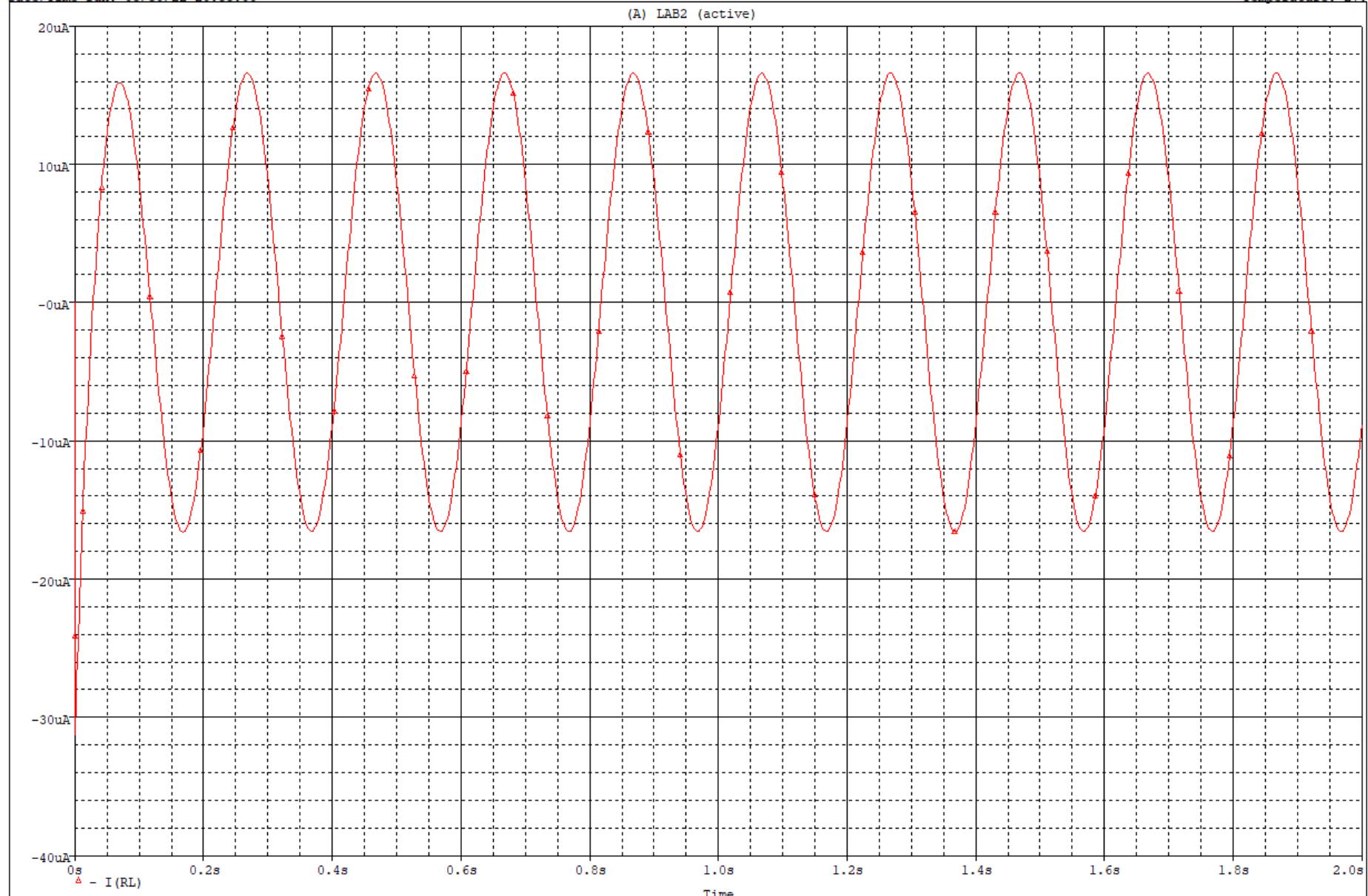


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Date: March 30, 2022

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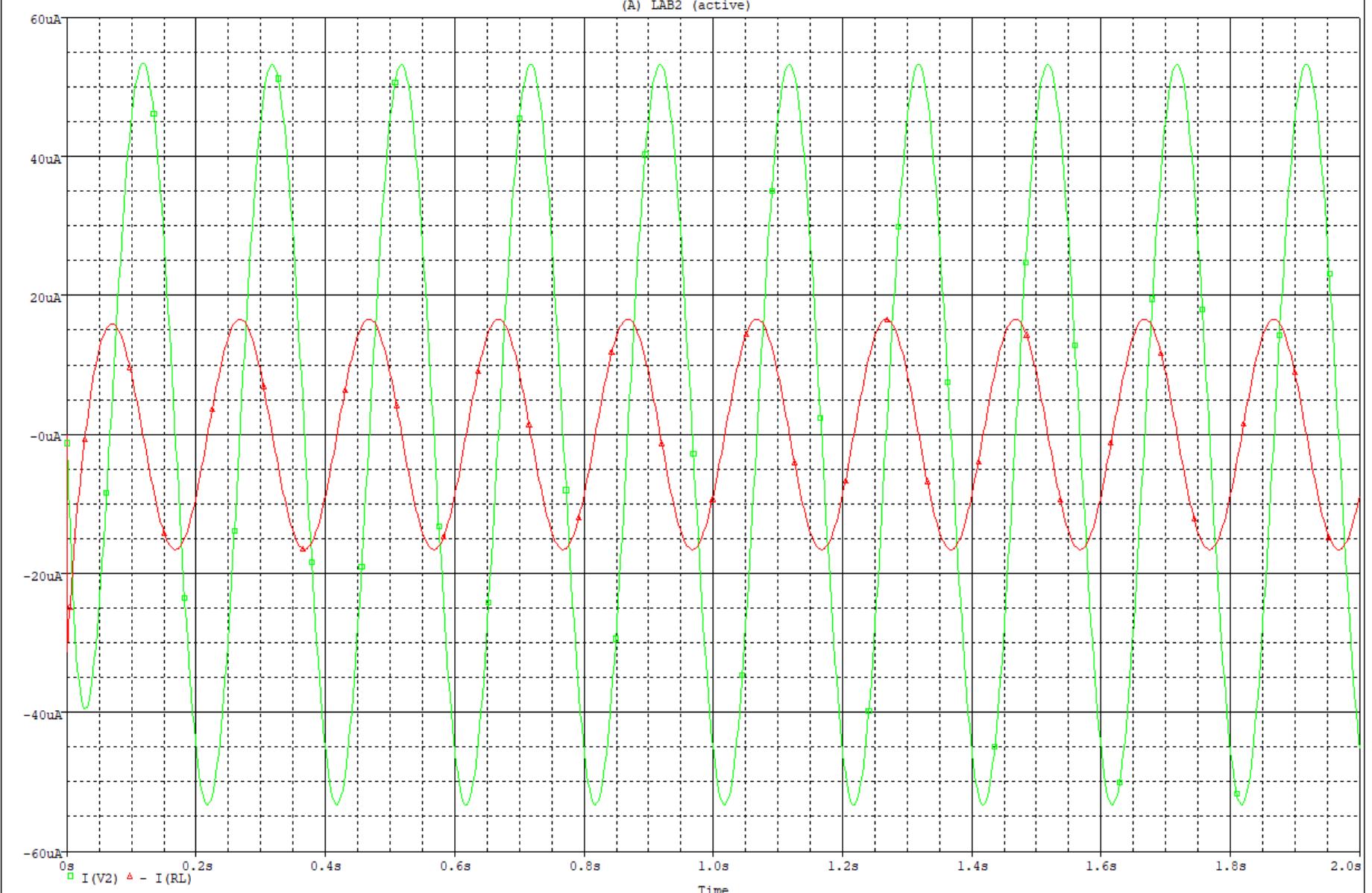
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(A) LAB2 (active)



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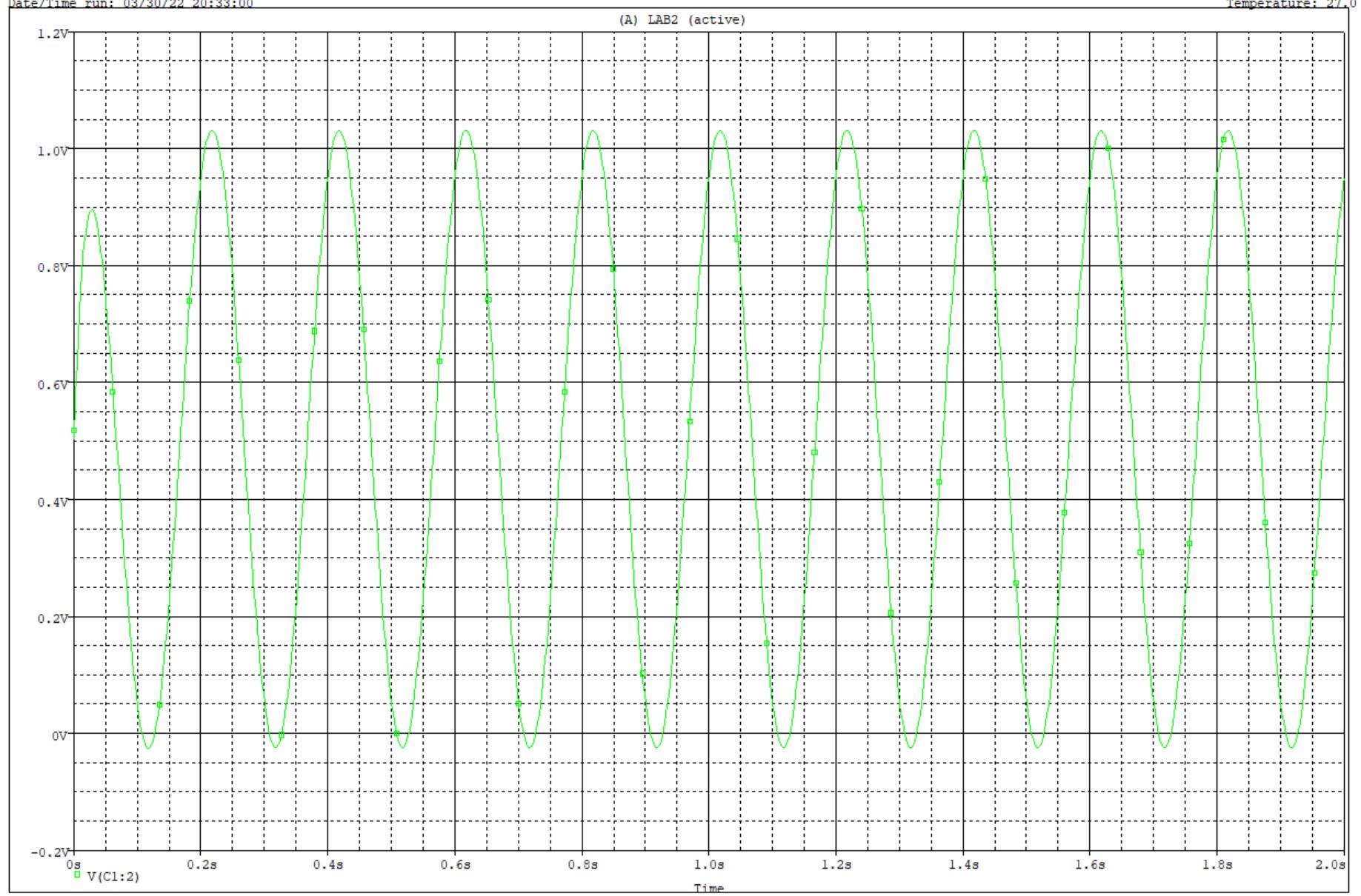
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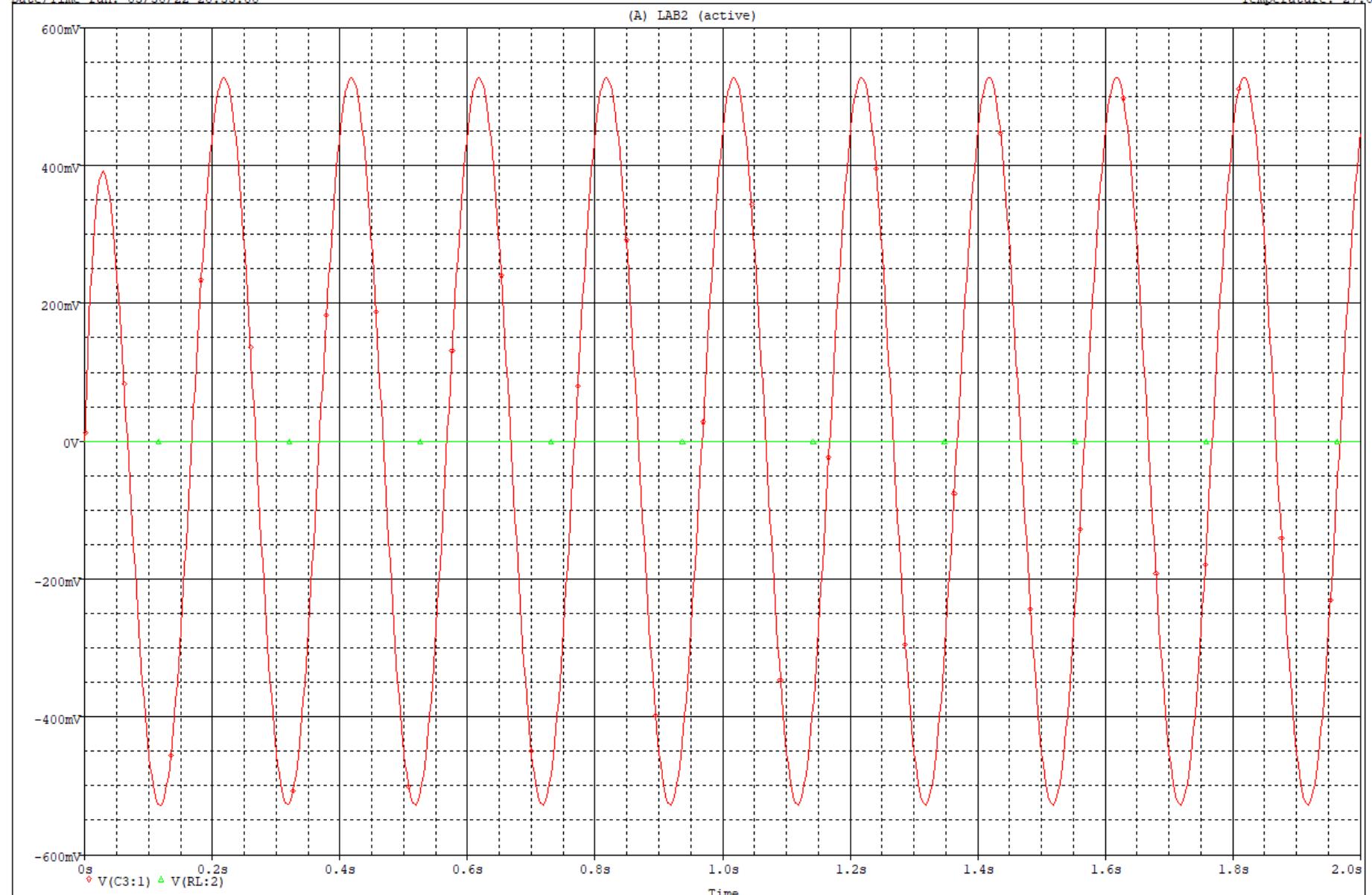
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