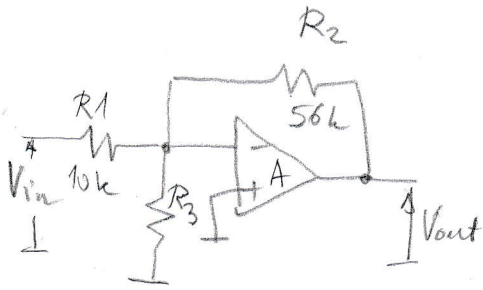


1



$$V_- \left( \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right) - V_{in} \frac{1}{R_1} - V_{out} \frac{1}{R_2} = 0$$

$$V_- \cdot (-100) = V_{out} \Rightarrow V_- = - \frac{V_{out}}{100}$$

$$- \frac{V_{out}}{100} \left( \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right) - V_{in} \frac{1}{R_1} - V_{out} \frac{1}{R_2} = 0$$

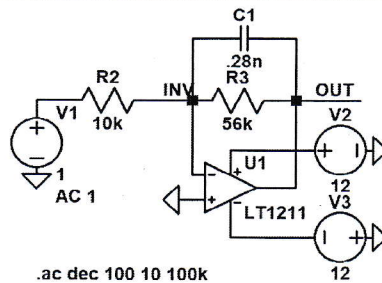
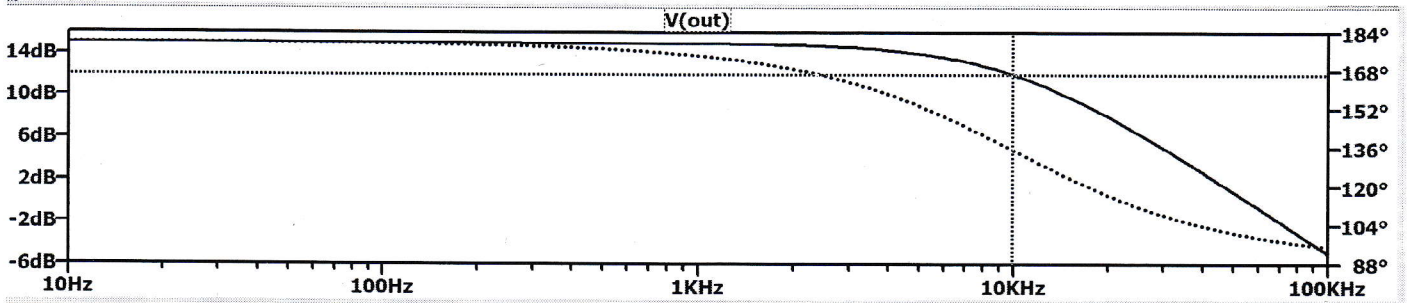
$$- \frac{V_{out}}{100} \left( \frac{1}{R_1} + \frac{101}{R_2} + \frac{1}{R_3} \right) - V_{in} \frac{1}{R_1} = 0$$

$$\frac{V_{out}}{V_{in}} = - \frac{100}{R_1 \cdot \left( \frac{1}{R_1} + \frac{101}{R_2} + \frac{1}{R_3} \right)} = -5 \Rightarrow \frac{100}{1 + 101 \frac{R_1}{R_2} + \frac{R_1}{R_3}} = 5$$

$$\frac{100}{1 + 101 \cdot \frac{10}{56} + \frac{10}{R_3}} = 5 \Rightarrow 20 = 1 + 101 \frac{10}{56} + \frac{10}{R_3} \Rightarrow \frac{10}{R_3} = 20 - 101 \frac{10}{56} - 1$$

$$\frac{10}{R_3} = 0,964 \Rightarrow R_3 = \frac{10}{0,964} = 10,37 \text{ k}\Omega$$

2



.ac dec 100 10 100k

| Cursor   | Freq         | Mag         | Phase      |
|----------|--------------|-------------|------------|
| Cursor 1 | 3.5053486kHz | 12.039317dB | 135.52423° |
| Cursor 2 |              | 8.545315dB  |            |