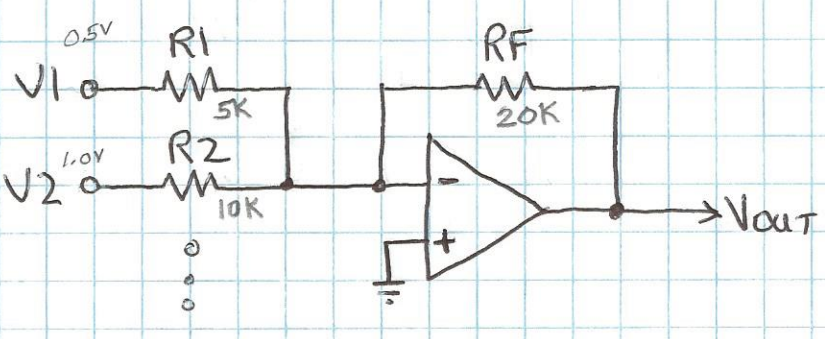
THE OP AMP SUMMING AMPLIFIER

(LESSON IN SUPERPOSITION)

① INVERTING CONFIGURATION

W2AEW



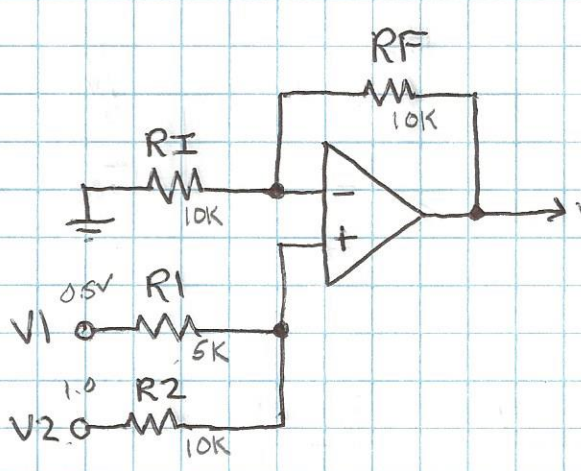
$$V_{OUT} = \frac{-V1 \cdot RF}{R1} - \frac{V2 \cdot RF}{R2} \cdots$$

CHARACTERISTICS

- EACH INPUT "SEES" A FIXED LOAD TO "VIRTUAL GROUND"
- NO INTERACTION FROM ONE INPUT TO ANOTHER
- EASY TO CALCULATE RESPONSE WITH ADDITIONAL INPUTS

② NON-INVERTING CONFIGURATION

W2AEW



$$V_{OUT} = (V_+)\left(\frac{RF}{RI} + 1\right)$$

(TWO INPUT CASE)

$$V_{OUT} = \left(\frac{RF}{RI} + 1\right) \cdot \left(V1 \cdot \frac{.333\,R2}{(R1+R2)} + \frac{.333\,V2 \cdot R1}{(R1+R2)} \right)$$

CHARACTERISTICS

- THE "LOAD" ON EACH INPUT DEPENDS ON THE OTHER INPUTS
- THERE CAN BE INTERACTION BETWEEN INPUTS, DEPENDING ON SOURCE'S OUTPUT IMPEDANCE
- A LITTLE MORE COMPLICATED TO CALCULATE

(SOMETIMES NICER TO DO THE "INVERTED" CASE, THEN FOLLOW THIS WITH ANOTHER "INVERT" STAGE)