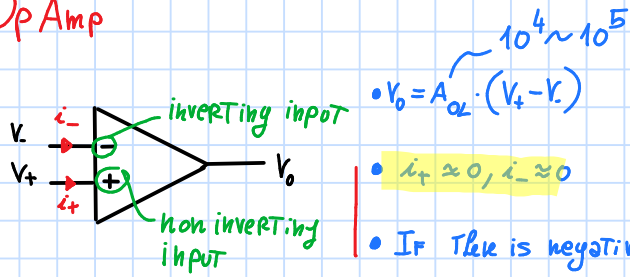
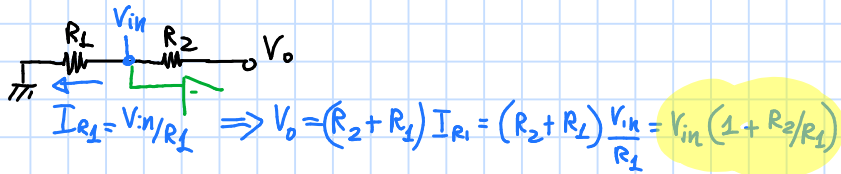
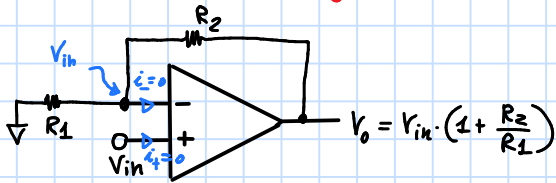


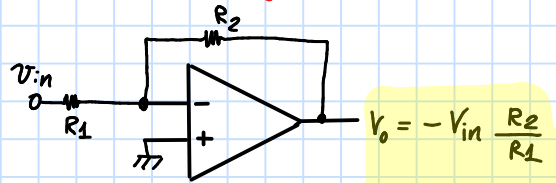
Op Amp



Non inverting Configuration

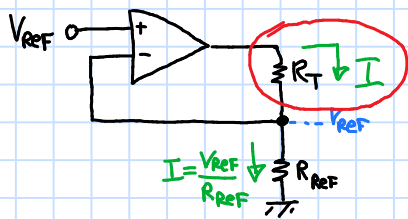


Inverting Configuration

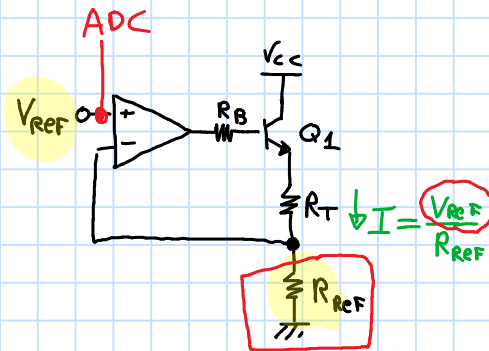


Website:

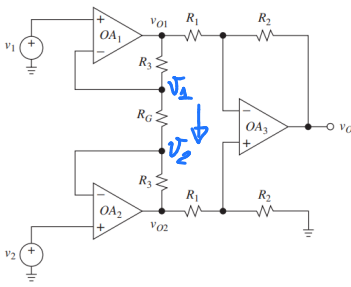
→ CURRENT GENERATOR



⇒



Instrument Amplifier (INA)



- $V_0 = G \cdot (V_2 - V_1)$

$$G = \left(1 + \frac{2R_3}{R_G}\right) \frac{R_2}{R_1}$$

LM358 $\approx 0,4\text{€}$

AD623 $\approx 5\text{€}/\text{chip}$

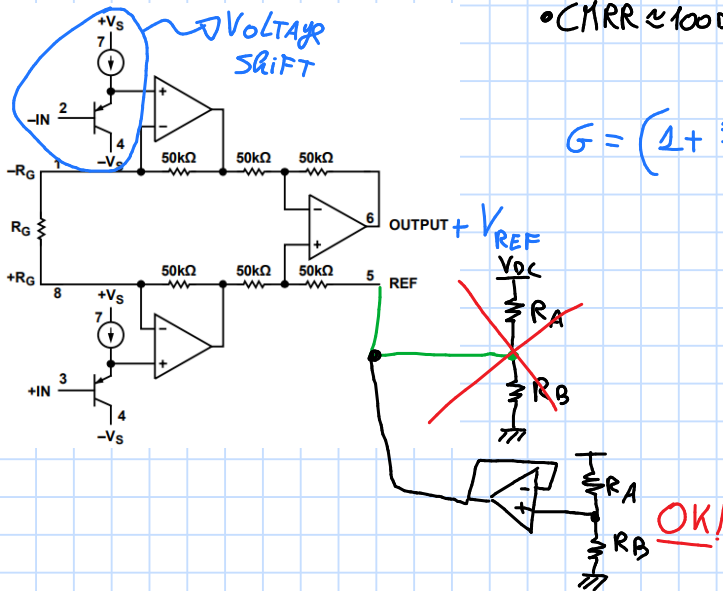
- Differential voltage: $V_D = V_2 - V_1$

- Common Mode voltage: $V_{CM} = \frac{V_2 + V_1}{2}$

$$V_D = \frac{G}{A_D} \cdot V_D + A_{CM} \cdot V_{CM}$$

- $CMRR_{dB} = 20 \cdot \log_{10} \left(\frac{A_D}{A_{CM}} \right)$
 \uparrow
 $\approx 100\text{ dB}$
 AD623

• AD623

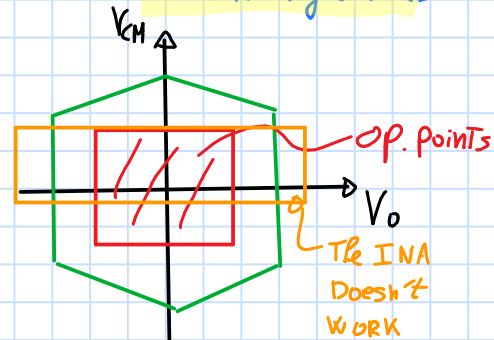


- $CMRR \approx 100\text{ dB}$

$$G = \left(1 + \frac{100k\Omega}{R_G}\right)$$

- Operating Limit

→ Tool: Diamond Plot
From Analog Devices

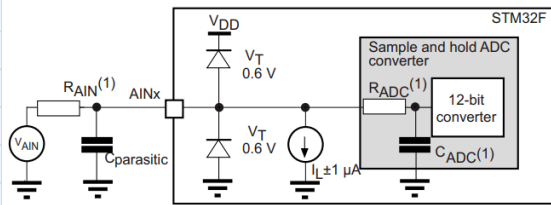


- Pressure Sensor

- PT5402 (100 bar)
- PT 5423 (60 bar)

Temperature Sensor

- TM4411
- NBPTCO-176



$$f_{clk} = 25 \text{ MHz}$$

$$T_{conv} = 15 \text{ ADC clock cycles}$$

$$T_{smp} = 28 \text{ "}$$

$$C_{ADC} \approx 7 \text{ pF} \quad R_{ADC} = 6 \text{ K}\Omega$$

Equation 1: R_{AIN} max formula

$$R_{AIN} = \frac{(k - 0.5)}{f_{ADC} \times C_{ADC} \times \ln(2^{N+2})} - R_{ADC}$$

The formula above (Equation 1) is used to determine the maximum external impedance allowed for an error below 1/4 of LSB. $N = 12$ (from 12-bit resolution) and k is the number of sampling periods defined in the ADC_SMPR1 register.