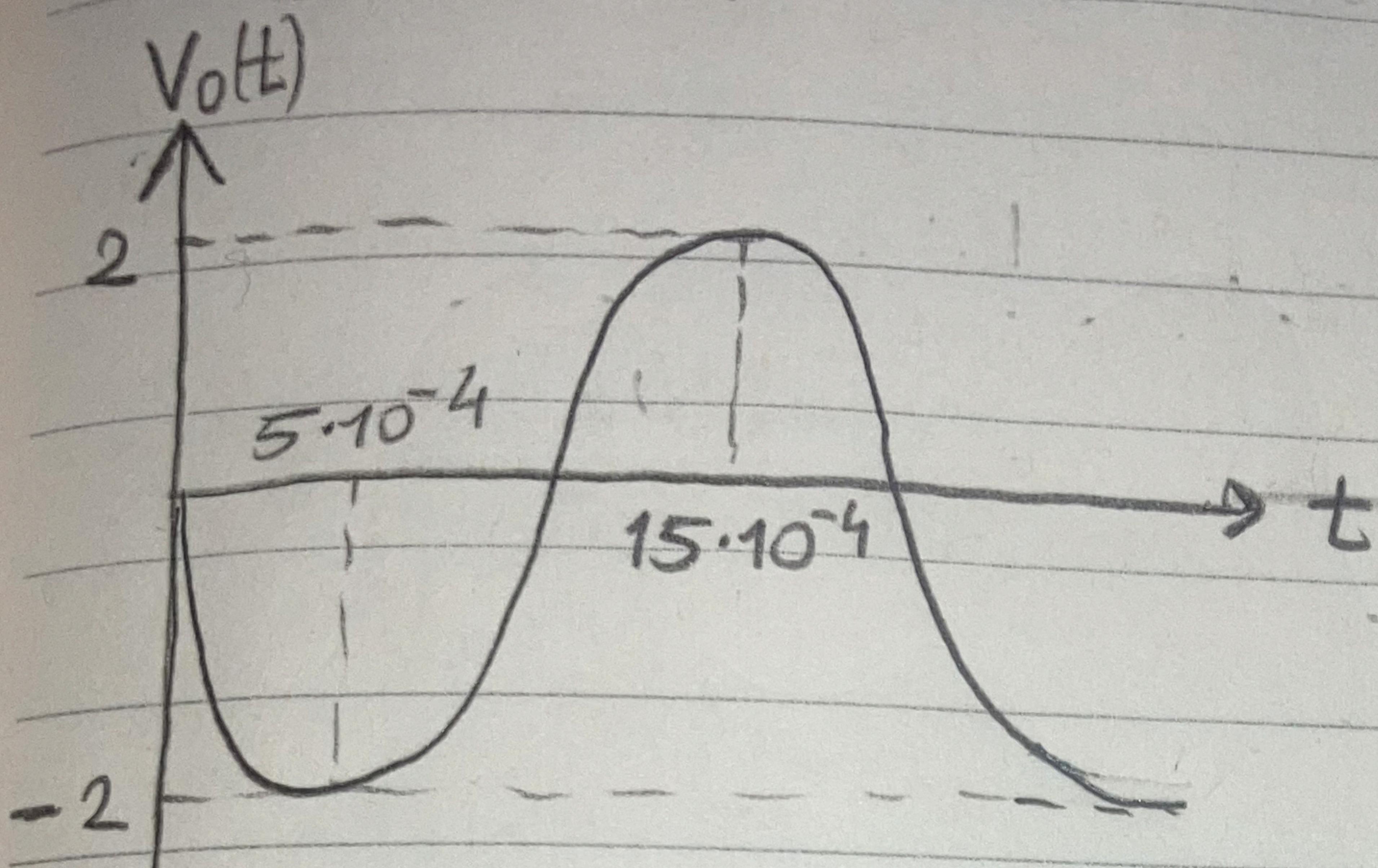


The graph of V_{2b} is:



The OPAMP is
a Difference
Amplifier.

3 Let $V_+ = V_- = V_1$.

$$\text{KCL } V_+: \frac{V_1 - V_{in}}{R_1} + \frac{V_1 - 2}{R_2} = 0.$$

$$\Rightarrow (R_1 + R_2)V_1 - 2R_1 = R_2V_{in} \Rightarrow V_1 = \frac{R_2V_{in} + 2R_1}{R_1 + R_2}$$

$$\text{KCL } V_-: \frac{V_1}{R_1} + \frac{V_1 - V_o}{R_2} = 0 \Rightarrow V_o = \frac{(R_1 + R_2)}{R_1} V_1$$

$$\Rightarrow V_o = \frac{(R_1 + R_2)}{R_1} \frac{(R_2V_{in} + 2R_1)}{(R_1 + R_2)} = \frac{R_2}{R_1} V_{in} + 2$$

$$V_o(t) = 0.33V_{in}(t) + 2 \text{ V}$$