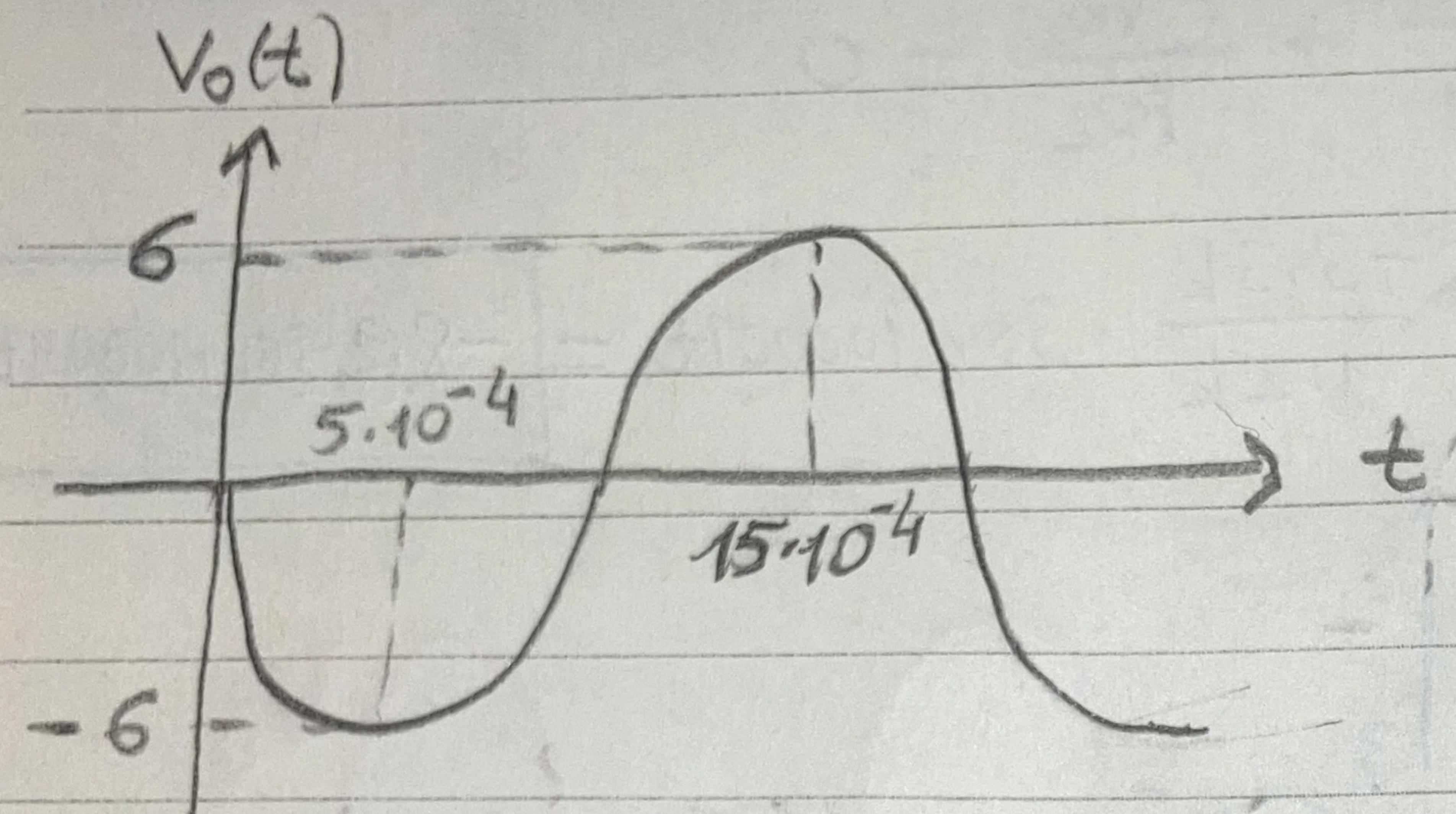


$$[2a] \text{ KCL } V_- : \frac{-V_a}{R_1} + \frac{-V_b}{R_2} + \frac{-V_o}{R_f} = 0.$$

$$\Rightarrow V_o = \frac{-R_f(R_2 V_a + R_1 V_b)}{R_1 R_2} = \frac{(10k) \cdot 6 \sin 1000\pi t}{-(10k)}$$

$$V_o = -6 \sin 1000\pi t \quad \checkmark$$



The OPAMP
is a summing
amplifier.

$$[2b] \text{ Let } V_+ = V_- = V_1.$$

$$\text{KCL } V_+ : \frac{V_1 - V_b}{R_2} + \frac{V_1}{R_4} = 0$$

$$\Rightarrow V_1 = \frac{R_4}{R_2 + R_4} V_b = \frac{V_b}{2} = \sin 1000\pi t$$

$$\text{KCL } V_- : \frac{V_1 - V_a}{R_1} + \frac{V_1 - V_o}{R_3} = 0$$

$$\Rightarrow \frac{-3 \sin 1000\pi t}{(1k)} + \frac{\sin 1000\pi t - V_o}{(1k)} = 0$$

$$\Rightarrow V_o = -2 \sin 1000\pi t \quad \checkmark$$