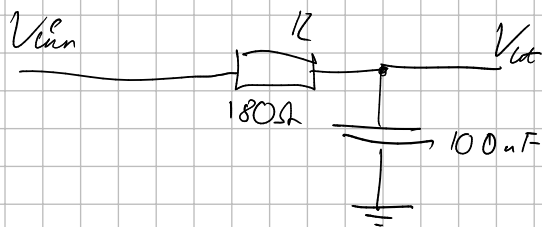


Motorola

1.1)



a) $I = I_{V_{out}} + i_c$

$$V_{in} = V_{out} + V_c$$

$$V_{in} = V_{out} + RC \frac{d}{dt} V_{out}$$

$$\frac{d}{dt} V_{out} = \frac{1}{RC} V_{in} - \frac{1}{RC} V_{out}$$

b) $R = 180 \Omega \quad C = 100 \text{ nF}$

$$\ddot{V} = -\frac{1}{RC} V_{out} + \frac{1}{RC} V_{in}$$

$$T = -\frac{1}{a} = -\frac{1}{-\frac{1}{RC}} = \underline{\underline{RC}} = 1,8 \cdot 10^{-5} \text{ s}$$

c) $\frac{d}{dt} V_{out} = -\frac{1}{RC} V_{out} + \frac{1}{RC} V_{in}$

$$\frac{d}{dt} V_{out} + \frac{1}{RC} V_{out} = \frac{1}{RC} V_{in} \quad \frac{1}{RC} = \lambda$$

$$\frac{d}{dt} V_{out} + \lambda V_{out} = \lambda V_{in}$$

$$\frac{d}{dt} (V_{out} e^{\lambda t}) = \lambda V_{in} e^{\lambda t} \quad \int \cdot \int dt$$

$$V_{out} e^{\lambda t} = V_{in} e^{\lambda t} + A \quad | \cdot e^{-\lambda t}$$

$$V_{out} = V_{in} + A e^{-\lambda t}$$

$$V_{out}(t) = V_{in} + A e^{-\frac{1}{RC} t} \quad V_{out}(0) = 0$$

$$V_{in} + A = 0$$

$$A = -V_{in}$$

$$V_{uc}(t) = V_{im} \left(1 - e^{-\frac{1}{RC}t} \right) \quad V_{im} = 1V$$

$$V_{uc}(t) = 1 - e^{-\frac{1}{RC}t}$$

