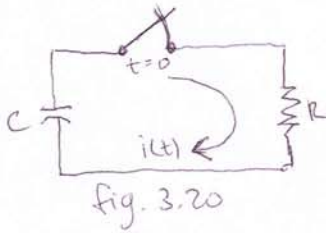


34039

3.611. Consider the RC circuit in fig. 3.20. The switch is closed at $t=0$. The capacitor voltage before the switch closing is V_0 . Find the capacitor voltage for $t \geq 0$.



$$V_C = I \cdot R$$

$$V_C = \frac{dV_C}{dt} \cdot C \cdot R$$

$$V_C(s) = RC (s V_C(s) - V_0)$$

$$V_C(s) = RC s V_C(s) - RC V_0$$

$$RC V_0 = RC s V_C(s) - V_C(s)$$

$$RC V_0 = (RC s - 1) V_C(s)$$

$$V_C(s) = \frac{RC V_0}{RC s - 1} \cdot \frac{1/RC}{1/RC}$$

$$= \frac{V_0}{s - 1/RC}$$

$$V_C(t) = V_0 \cdot e^{-1/RC \cdot t}$$

$$= V_0 \cdot e^{-t/RC}$$