Referensi : $v_c(0) \equiv 10$

$$\frac{dv_c(t)}{dt} = -\frac{1}{RC} v_c(t)$$

$$v_c(t) = 10\, e^{-t/RC}$$

$\Rightarrow$ Simulink

$$\int \frac{dx}{x} = \int x^{-1} dx =$$

$$\int x^2 dx = \frac{1}{3}x^3 + K$$

$$\int x\, dx = \frac{1}{2}x^2 + K$$

$$\int dx = x$$

$$\int dt = t$$

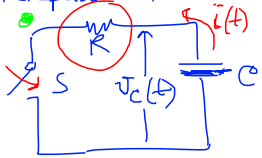
$$\int x^{-1} dx = \ln x = {}^{e}\log x$$

$$\int x^{-2} dx = -x^{-1}$$

$$\int x^{-3} dx = -\frac{1}{2}x^{-2}$$

Project 1 Verifikasi SIMULINK

Pelepasan muatan KAPASITOR (discharge)



Pada $t=0$, kapasitor sudah bermuatan sehingga

$v_c(t) = 10$ Volt, $t=0$

$v_c(0) = 10$ V

Analisis. Pada $t=0$, saklar S ditutup sehingga terjadi pelepasan muatan, berlaku Hukum Ohm.

$$i(t) = C \frac{dv_c(t)}{dt}$$ ← perubahan tegangan pada kapasitor terhadap waktu pelepasan muatan

$$0 - v_c(t) = R\, i(t)$$

$$i(t) = -\frac{1}{R} v_c(t)$$

Jadi : $$C \frac{dv_c(t)}{dt} = -\frac{1}{R} v_c(t)$$

$$\frac{dv_c(t)}{dt} = -\frac{1}{RC} v_c(t)$$

$$\int \frac{dv_c(t)}{v_c(t)} = \int -\frac{1}{RC} dt = -\frac{1}{RC} \int dt$$

$$e^{\log [v_c(t)]} = -\frac{1}{RC} t + K$$

$\log a = b$; $e^{\log a} = a$; $a = e^b$

$$v_c(t) = e^{\left(\frac{-t}{RC} + K\right)} = e^K \cdot e^{-\frac{t}{RC}} = A \cdot e^{-\frac{t}{RC}}$$

$v_c(0) = 10$

$A e^{-0/RC} = 10 \rightarrow A = 10$