

Solusi $x(t)$ dapat diperoleh secara analitik dengan kalkulus:

$$\frac{dx(t)}{dt} = ax(t) \rightarrow \int \frac{dx(t)}{x(t)} = \int a dt$$

$$\begin{aligned} \int \frac{dx}{x} &= \int \left(\frac{1}{x} \right) dx \\ &= \int x^{-1} dx \\ &= \ln x \end{aligned}$$

$$\ln[x(t)] = at + C$$

$$\log[x(t)] = at + C$$

$$x(t) = e^{at+C} = e^C \cdot e^{at} = K e^{at}$$

Kondisi Awal

$$\begin{aligned} \log a &= {}^{10}\log a = b \\ a &= 10^b \end{aligned}$$

$$x(0) = X_0 \rightarrow x(0) = K e^0 = K = X_0$$

Solusi: $x(t) = X_0 e^{at}$