

Pers. diff: $\frac{dx(t)}{dt} = A x(t)$, $x(0) = X_0$

Solusi: $x(t) = [e^{At}] X_0$

Definisi: $[e^{At}] = \left[I + At + \frac{1}{2}A^2t^2 + \frac{1}{6}A^3t^3 + \frac{1}{24}A^4t^4 + \dots \right]$
[n x n]

sehingga $x(t) = \left[I + At + \frac{1}{2}A^2t^2 + \frac{1}{6}A^3t^3 + \frac{1}{24}A^4t^4 + \dots \right] X_0$

$$\frac{dx(t)}{dt} = \left[A + A^2t + \frac{1}{2}A^3t^2 + \frac{1}{6}A^4t^3 + \dots \right] X_0$$

$$= A \left[I + At + \frac{1}{2}A^2t^2 + \frac{1}{6}A^3t^3 + \dots \right] X_0$$

$$= A [e^{At}] X_0 = A x(t) \quad \text{--- terbukti}$$