Definisi : $e^x = 1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3 + \text{———} + \frac{1}{n!}x^n +$

$x = 1 \longrightarrow e = e^1 = 1 + 1 + \frac{1}{2} + \frac{1}{6} + \frac{1}{24} + \frac{1}{120} + \text{———}$

$x(t) = X_0 e^{at} = X_0 \left(1 + at + \frac{1}{2}a^2t^2 + \frac{1}{6}a^3t^3 + \frac{1}{24}a^4t^4 + \text{———}\right)$

$\frac{dx(t)}{dt} = X_0 \left(a + a^2t + \frac{1}{2}a^3t^2 + \frac{1}{6}a^4t^3 + \text{———}\right)$

$= aX_0 \left(1 + at + \frac{1}{2}a^2t^2 + \frac{1}{6}a^3t^3 + \dots\right)$

$= a\underbrace{X_0 e^{at}} = a\,x(t) \longrightarrow$ kembali ke pers. diff

Jadi terbukti bahwa $x(t) = X_0 e^{at}$ adalah solusi dari pers. diff. $\frac{dx(t)}{dt} = a\,x(t)$

Bgm kalau $x(t)$: vektor $[n \times 1]$
dan A = matrix $[n \times n]$