

$$x(t) = X_0 \left(1 + at + \frac{1}{2} a^2 t^2 + \frac{1}{6} a^3 t^3 + \frac{1}{24} a^4 t^4 + \dots - \frac{1}{n!} a^n t^n \right)$$

$$\begin{aligned} \frac{dx(t)}{dt} &= X_0 \left(a + at + \frac{1}{2} a^2 t^2 + \frac{1}{6} a^3 t^3 + \dots - \frac{1}{(n-1)!} a^{n-1} t^{n-1} \right) \\ &= a x(t) \end{aligned}$$

$$e^{at} = 1 + at + \frac{1}{2} a^2 t^2 + \frac{1}{6} a^3 t^3 + \dots + \frac{1}{n!} a^n t^n$$

Мисалыа $at=1$

$$\begin{aligned} e &= 1 + 1 + \frac{1}{2} + \frac{1}{6} + \frac{1}{24} + \frac{1}{120} + \dots + \frac{1}{n!} \dots \\ &= \sum_{k=0}^{\infty} \frac{1}{k!} \end{aligned}$$

Бгын $\dot{x} = Ax \rightarrow A [n \times n] \quad x [n \times 1]$

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

$[n \times n]$