

Kestabilan:

Misalnya $A = \begin{bmatrix} \lambda_1 & & 0 \\ & \lambda_2 & \\ 0 & & \ddots \\ & & & \lambda_n \end{bmatrix}$ $\lambda_1, \lambda_2, \dots, \lambda_n$
adalah nilai
eigen matrix A
 $\lambda = a \pm jb,$

maka:

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

$$= \begin{bmatrix} 1 + \lambda_1 t + \frac{1}{2} \lambda_1^2 t^2 + \dots & & 0 \\ & 1 + \lambda_2 t + \frac{1}{2} \lambda_2^2 t^2 + \dots & \\ & & \ddots & \\ 0 & & & 1 + \lambda_n t + \frac{1}{2} \lambda_n^2 t^2 + \dots \end{bmatrix}$$

$$x(t) = x_0 e^{At} \\ = \begin{bmatrix} x_{10} e^{\lambda_1 t} \\ x_{20} e^{\lambda_2 t} \\ \vdots \\ x_{n0} e^{\lambda_n t} \end{bmatrix}$$

$$= \begin{bmatrix} e^{\lambda_1 t} & & 0 \\ & e^{\lambda_2 t} & \\ 0 & & \ddots & \\ & & & e^{\lambda_n t} \end{bmatrix}$$