

* Model Ruang Keadaan ke Model Nisbah Alih

>>> ss2tf <-

$$\begin{aligned} \dot{x} &= Ax + Bu && \leftarrow \text{Pers. Keadaan} \\ y &= Cx + Du && \leftarrow \text{Pers. Keluaran} \end{aligned}$$

$$\begin{aligned} \text{SISO} &\Rightarrow u[1 \times 1] \quad y[1 \times 1] \quad x[n \times 1] \rightarrow A[n \times n], B[n \times 1] \\ \text{LTI} &\Rightarrow A, B, C \text{ dan } D \text{ konstanta} \quad C[1 \times n], D[1 \times 1] \end{aligned}$$

$$\dot{x} = \frac{dx(t)}{dt} = Ax(t) + Bu(t) \quad x(t) = \begin{bmatrix} x_1(t) \\ x_2(t) \\ \vdots \\ x_n(t) \end{bmatrix}$$

Trans. Laplace:

$$\begin{aligned} sX(s) &= AX(s) + BU(s) \\ sX(s) - AX(s) &= BU(s) \rightarrow \underbrace{[sI - A]}_{[n \times n]} X(s) = \underbrace{BU(s)}_{[n \times 1]} \end{aligned}$$