

* Model Running Keadaan $\Rightarrow$ Nisbah Alih
(STATE SPACE) (TRANSFER FUNCTION)

$$\underline{u} \rightarrow \boxed{\begin{matrix} \dot{x} = Ax + Bu \\ y = Cx + Du \end{matrix}} \rightarrow y \Rightarrow \begin{matrix} \rightarrow \boxed{G(s)} \rightarrow \\ U(s) \quad Y(s) \end{matrix}$$

Berlaku: * SISO

$A[n \times n], B[n \times 1]$ * LTI $\rightarrow A, B, C, D$
 $C[1 \times n], D[1 \times 1]$ konstanta

$$\dot{x} = \frac{dx(t)}{dt} = Ax(t) + Bu(t)$$

$$sX(s) = AX(s) + BU(s)$$

$$sX(s) - AX(s) = BU(s)$$

$$[sI - A]X(s) = BU(s)$$

$$X(s) = [sI - A]^{-1}BU(s)$$

$$U(s) = \int_0^\infty u(t)e^{-st}dt$$

$$Y(s) = \int_0^\infty y(t)e^{-st}dt$$

$$Y(s) = CX(s) + DU(s)$$

$$= C[sI - A]^{-1}BU(s) + DU(s)$$

$$Y(s) = [C[sI - A]^{-1}B + D]U(s)$$

$$Y(s) = G(s)U(s)$$