$$\dot{x}_1 = x_2$$
$$\dot{x}_2 = x_3$$
$$\dot{x}_3 = x_4$$
$$\vdots$$
$$\dot{x}_{n-2} = x_{n-1}$$
$$\dot{x}_{n-1} = x_n$$
$$\dot{x}_n = \frac{d^n x(t)}{dt^n} = -\frac{a_0}{a_n}x_1 - \frac{a_1}{a_n}x_2 - \frac{a_2}{a_n}x_3 - \cdots - \frac{a_{n-1}}{a_n}x_n + \frac{1}{a_n}u$$

$$\dot{x} = \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \vdots \\ \dot{x}_{n-1} \\ \dot{x}_n \end{bmatrix} = \underbrace{\begin{bmatrix} 0 & 1 & 0 & \cdots & 0 \\ 0 & 0 & 1 & \cdots & 0 \\ & 0 & & \ddots & 0 \\ & & & & 0 \\ & & & & 1 \\ -\frac{a_0}{a_n} & \cdots & & \cdots & -\frac{a_{n-1}}{a_n} \end{bmatrix}}_{A[n\times n]} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_{n-1} \\ x_n \end{bmatrix} + \underbrace{\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ \vdots \\ 0 \\ 1/a_n \end{bmatrix}}_{B[n\times 1]} u$$

Persamaan keadaan $\dot{x} = Ax + Bu$ diperoleh dari Persamaan (1). Pers. keluaran $y = Cx + Du$ diperoleh dari Persamaan (2)