Contoh:

Jika diketahui $G(s) = \dfrac{2s+3}{10s^7+5s^4+1}$

tentukan model Ruang Keadaan dengan matrix A[nxn] merupakan Jordan Companian Matrix

Jawab

Dari G(s)

Model Ruang Keadaan

$$\begin{bmatrix} \dot{x} = Ax + Bu \\ y = Cx + Du \end{bmatrix}$$

$n = 1$, $b_0 = 3$, $b_1 = 2$

$n = 7$, $a_0 = 1$, $a_1 = 0$, $a_2 = 0$, $a_3 = 0$, $a_4 = 5$, $a_5 = 0$, $a_6 = 0$, $a_7 = 10$

$$A_{[3\times3]} = \begin{bmatrix} 0&1&0&0&0&0&0 \\ 0&0&1&0&0&0&0 \\ 0&0&0&1&0&0&0 \\ 0&0&0&0&1&0&0 \\ 0&0&0&0&0&1&0 \\ 0&0&0&0&0&0&1 \\ -0.1&0&0&0&-0.5&0&0 \end{bmatrix} \qquad B_{[3\times1]} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0.1 \end{bmatrix}$$

$$C_{[1\times7]} = \begin{bmatrix} 3 & 2 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \qquad D_{[1\times1]} = [0]$$

Kasus m=n

$$\boxed{G(s) = \frac{4s^7+2s+3}{10s^7+5s^4+1}}$$

matrix C ??? dan D

$m=7$	$n=7$
$b_0 = 3$	$a_0 = 1$
$b_1 = 2$	$a_1 = 0$
$b_2 = 0$	$a_2 = 0$
$\vdots$	$a_3 = 0$
$b_6 = 0$	$a_4 = 5$
$b_7 = 4$	$a_5 = 0$
	$a_6 = 0$
	$a_7 = 10$

matrix A & B SAMA dengan di atas