

FAKULTAS TEKNIK
UNIVERSITAS HASANUDDIN

No. Stb. : D041171320 / Jurusan ELEKTRO
Mata Pelajaran : SISTEM KENDALI I
Semester : V (LIMA)
Strata : S1
Tgl. Ujian : 1 NOVEMBER 2019

m = 2

n = 3

b₀ = 1

a₀ = 1

b₁ = 0

a₁ = 6

b₂ = 8

a₂ = 12

a₃ = 8

$$\begin{aligned} 1. (a) G(s) &= \frac{8s^2 + 1}{(2s + 1)^3} \\ &= \frac{8s^2 + 1}{8s^3 + 12s^2 + 6s + 1} \\ &\rightarrow (2s+1)(2s+1)(2s+1) \\ &= (4s^2 + 2s + 2s + 1)(2s+1) \\ &= (4s^2 + 4s + 1)(2s+1) \\ &= 8s^3 + 4s^2 + 8s^2 + 4s + 2s + 1 \\ &= 8s^3 + 12s^2 + 6s + 1 \end{aligned}$$

$$A = [3 \times 3]$$

$$B = [3 \times 1]$$

$$C = [1 \times 3]$$

$$D = [\phi]$$

$$\begin{aligned} \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} &= \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -\frac{a_0}{a_n} & -\frac{a_1}{a_n} & -\frac{a_2}{a_n} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ \frac{1}{a_n} \end{bmatrix} u \\ &= \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -0,125 & -0,75 & -1,5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 0,125 \end{bmatrix} u \\ A &= [3 \times 3] \quad B = [3 \times 1] \end{aligned}$$

$$y = \underbrace{[1 \ 0 \ 8]}_{C=[1 \times 3]} x$$

$$\begin{aligned} (b) G(s) &= \frac{8s^3 + 1}{(2s + 1)^3} \\ &= \frac{8s^3 + 1}{8s^3 + 12s^2 + 6s + 1} \end{aligned}$$

m = 3

n = 3

b₀ = 1

a₀ = 1

b₁ = 0

a₁ = 6

b₂ = 0

a₂ = 12

b₃ = 8

a₃ = 8

$$A = [3 \times 3]$$

$$B = [3 \times 1]$$

$$\begin{aligned} \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} &= \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -0,125 & -0,75 & -1,5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 0,125 \end{bmatrix} u \end{aligned}$$