

Nomor 1

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FAKULTAS TEKNIK
UNIVERSITAS HASANUDDIN

No. Stb. : D041171317/Jurusan Elektro
Mata Pelajaran : Sistem Kendali
Semester : 4
Strata : S-1
Tgl. Ujian : 01 November 2019

1) a) $G(s) = \frac{8s^2+1}{(2s+1)^3}$

↳ penyebut

$$(2s+1)(2s+1)^2$$

$$(2s+1)(4s^2+4s+1)$$

$$8s^3+8s^2+2s+4s^2+4s+1$$

$$8s^3+12s^2+6s+1$$

$$G(s) = \frac{8s^2+1}{8s^3+12s^2+6s+1}$$

$$m=2$$

$$n=3$$

$$b_0=1$$

$$a_0=1$$

$$b_1=0$$

$$a_1=6$$

$$b_2=8$$

$$a_2=12$$

$$a_3=8$$

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

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

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

$$D=[\phi]$$

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1/8 & 6/8 & 12/8 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0,125 & 0,75 & 1,5 \end{bmatrix}$$

$$B = \begin{bmatrix} 0 \\ 0 \\ 1/8 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0,125 \end{bmatrix}$$

$$C = [1 \ 0 \ 8]$$

$$D = [\phi]$$

b) $G(s) = \frac{8s^3+1}{(2s+1)^3}$

$$G(s) = \frac{8s^3+1}{8s^3+12s^2+6s+1}$$

$$m=3$$

$$n=3$$

$$b_0=1$$

$$a_0=1$$

$$b_1=0$$

$$a_1=6$$

$$b_2=0$$

$$a_2=12$$

$$b_3=8$$

$$a_3=8$$

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

$$u/G'(s)$$

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

$$b_0=0$$

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

$$b_1=-6$$

$$D=[1 \times 1]$$

$$b_2=-12$$

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0,125 & 0,75 & 1,5 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 0,125 \end{bmatrix}$$

→ untuk matriks C dan D

$$G(s) = G'(s) + D$$

$$\frac{1}{8s^3+12s^2+6s+1} = \frac{8s^3}{8s^3+12s^2+6s+1} + \frac{-12s^2-6s}{8s^3+12s^2+6s+1}$$

$$G'(s) = \frac{-12s^2-6s}{8s^3+12s^2+6s+1}$$

$$C = [0 \ -6 \ -12] \text{ dan } D = [1]$$