



دانشگاه سمنان

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دانشکده مهندسی مکانیک



دانشکده مهندسی مکانیک

تمرین درس کنترل

نام و شماره دانشجویی:

CONTROL EXERCISES

HW-3

□ تمرین های زیر از کتاب کنترل مدرن اوگاتا (5th Ed.) :

❖ Modern Control Engineering (5th Edition) by Katsuhiko Ogata

B-2-3❖

B-2-7❖

B-2-9❖

B-2-11❖

❖ تصاویر سوالات در ادامه ارائه شده است.

B-2-3. Simplify the block diagram shown in Figure 2-31 and obtain the closed-loop transfer function $C(s)/R(s)$.

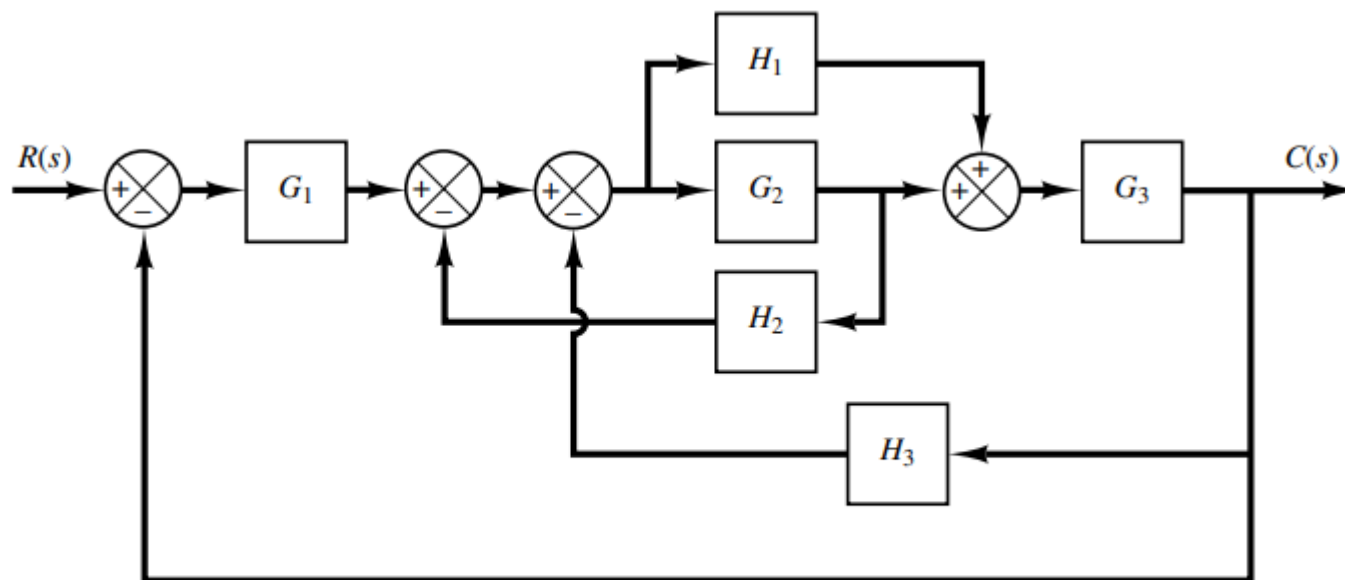


Figure 2-31
Block diagram of a system.

B-2-7. Obtain the transfer functions $C(s)/R(s)$ and $C(s)/D(s)$ of the system shown in Figure 2-34.

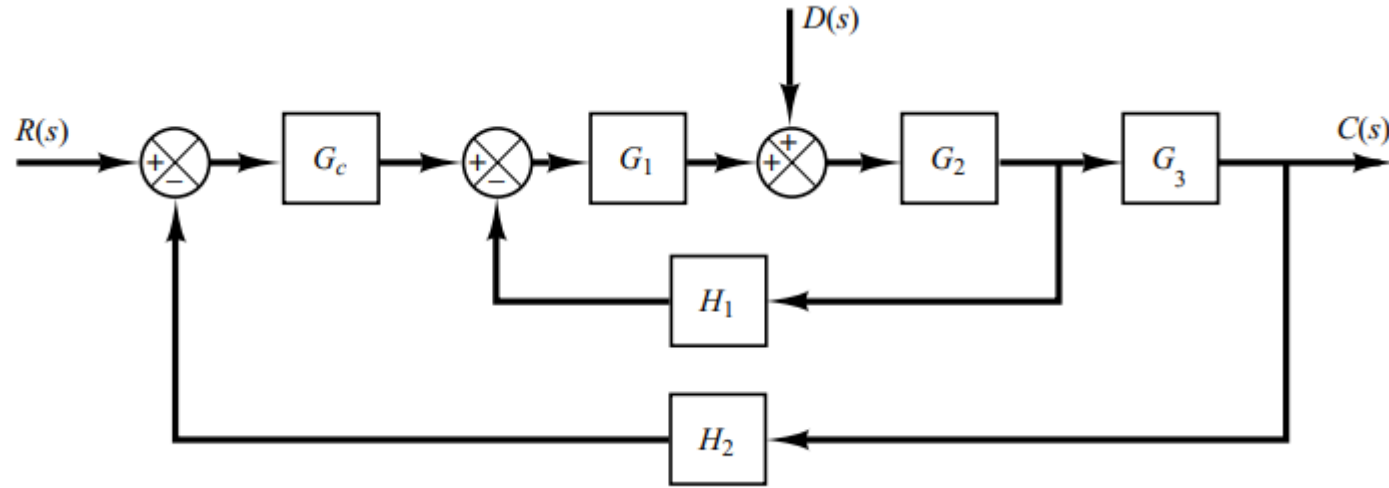


Figure 2-34
Control system.

B-2-9. Consider the system described by

$$\ddot{y} + 3\dot{y} + 2y = u$$

Derive a state-space representation of the system.

B-2-11. Consider a system defined by the following state-space equations:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -5 & -1 \\ 3 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 2 \\ 5 \end{bmatrix} u$$
$$y = [1 \quad 2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Obtain the transfer function $G(s)$ of the system.