

Control Systems

Lecture: 2

Examples of SFG

Figure 2.17

Signal-flow graph components:

a. system;

b. signal;

c. interconnection of systems and signals

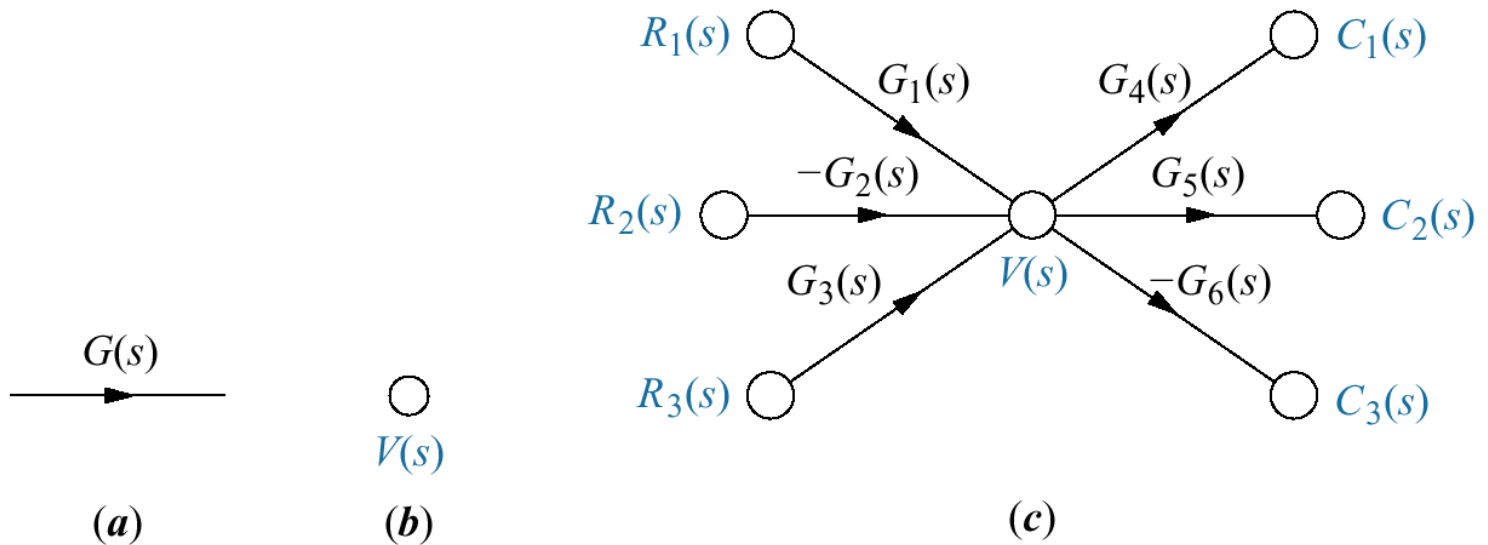


Figure 2.18

Building signal-flow graphs:

- a.** cascaded system nodes (from Figure 5.3(a));
- b.** cascaded system signal-flow graph;
- c.** parallel system nodes (from Figure 5.5(a));
- d.** parallel system signal-flow graph;
- e.** feedback system nodes (from Figure 5.6(b));
- f.** feedback system signal-flow graph

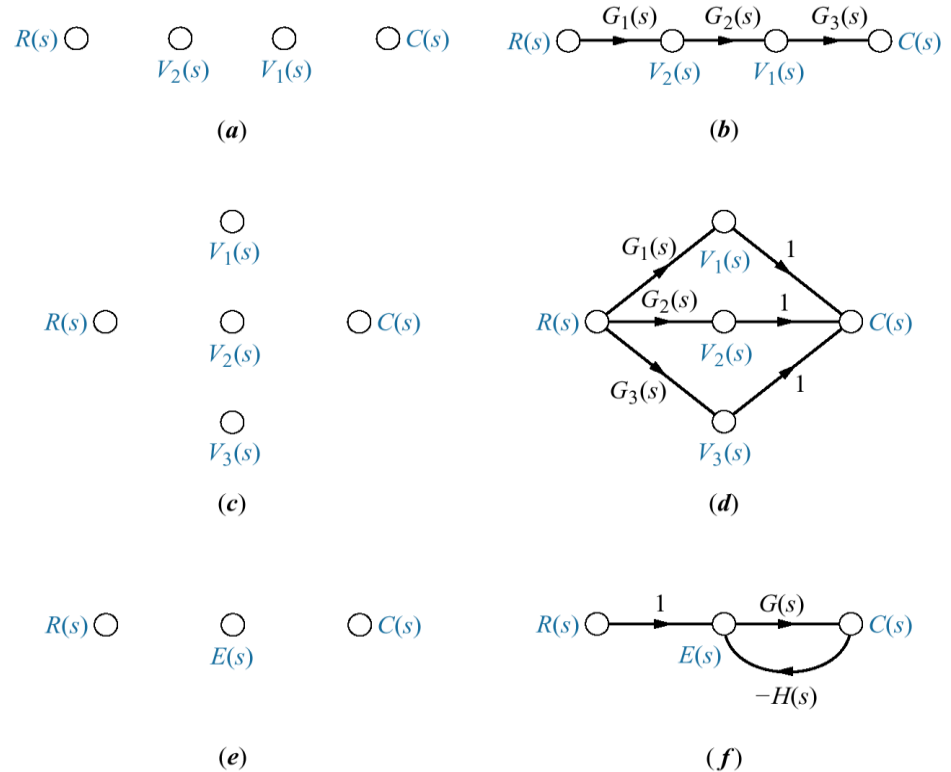


Figure 2.19

Signal-flow graph development:

a. signal nodes;

b. signal-flow graph;

c. simplified signal-flow graph

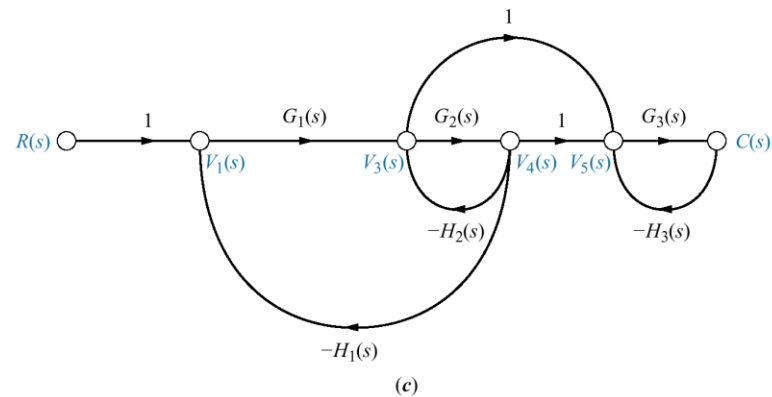
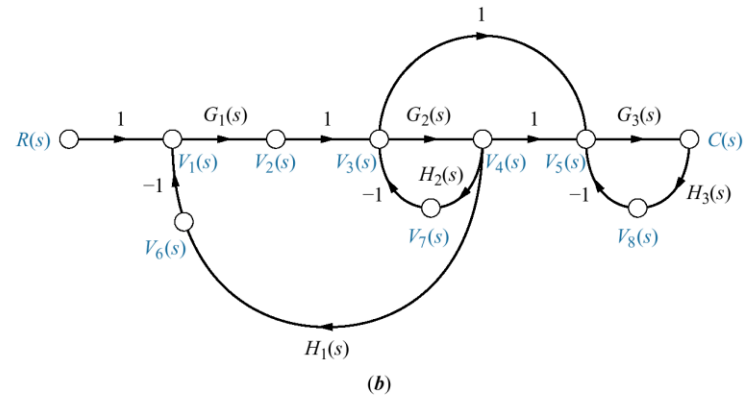
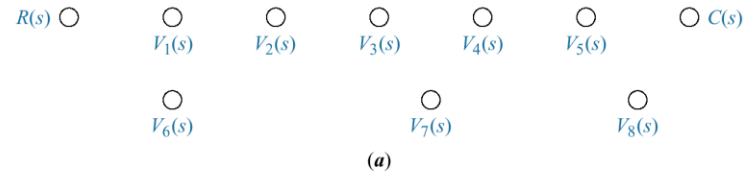


Figure 2.20

Signal-flow graph for demonstrating Mason's rule

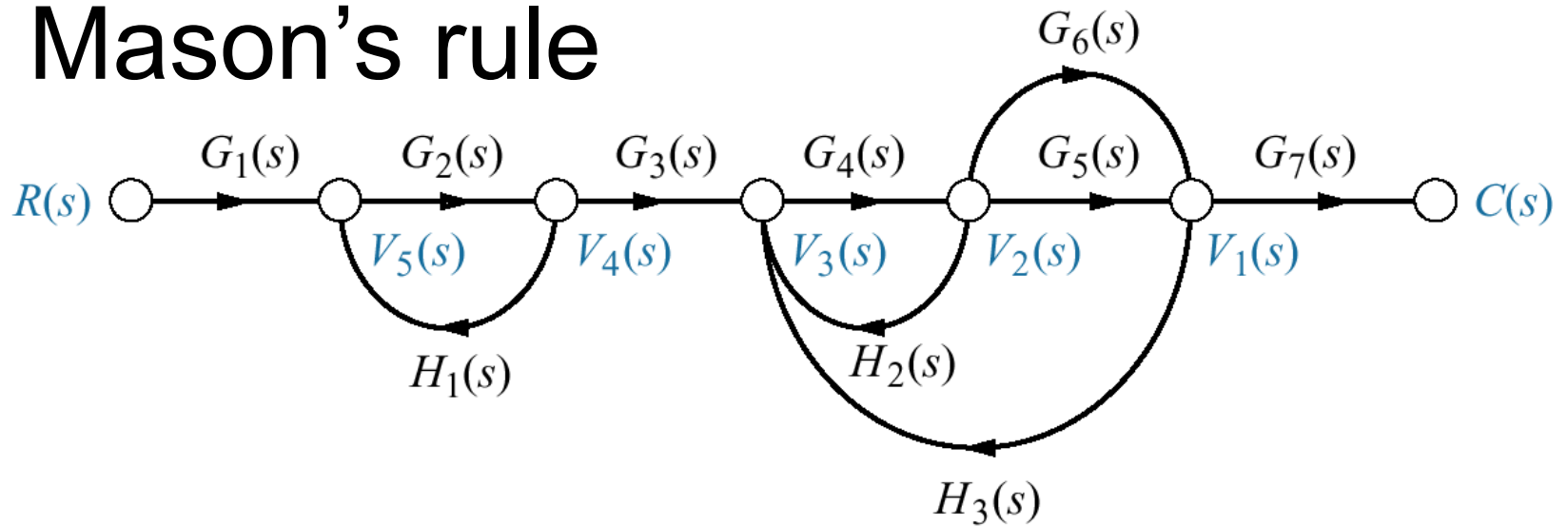


Figure 2.21

Signal-flow graph for Example 5.7

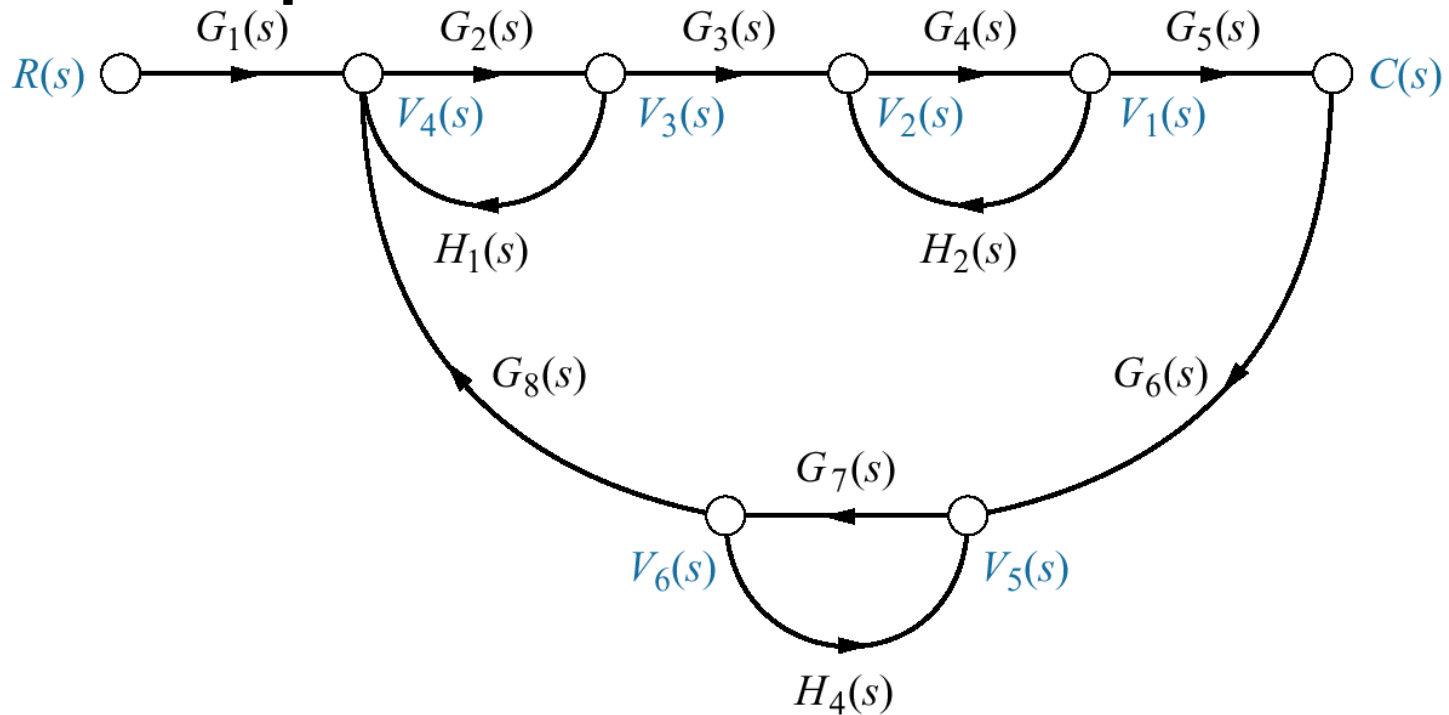


Figure 2.22

Stages of development of a signal-flow graph for the system of Eqs. 5.36:

- a. place nodes;
- b. interconnect state variables and derivatives;
- c. form dx_1/dt ;
- d. form dx_2/dt (figure continues)

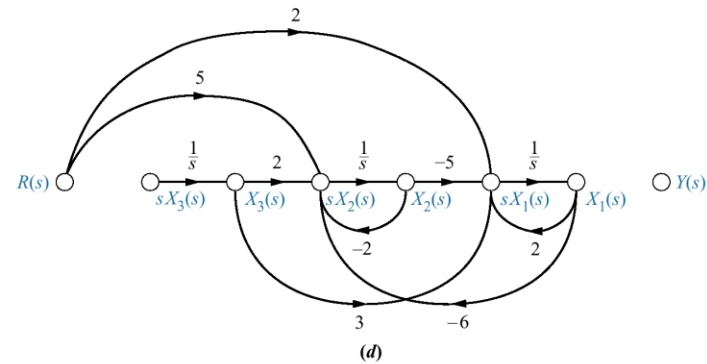
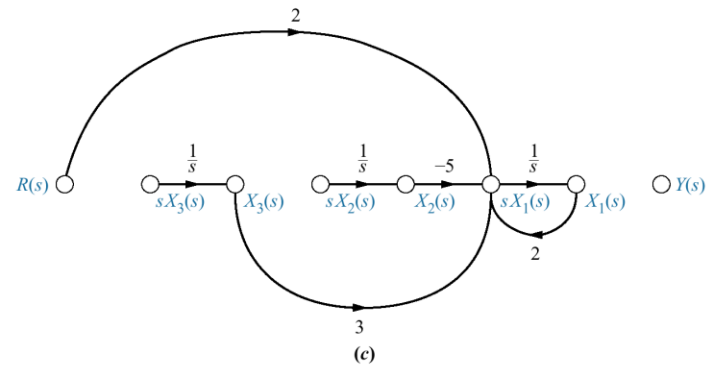
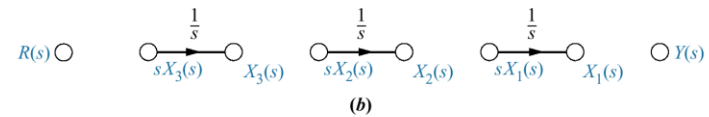
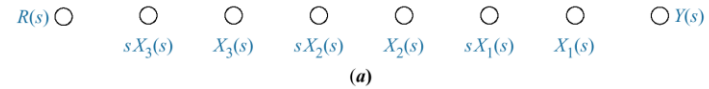


Figure 2.23

Representation of
Figure 3.10 system
as
cascaded first-order
systems

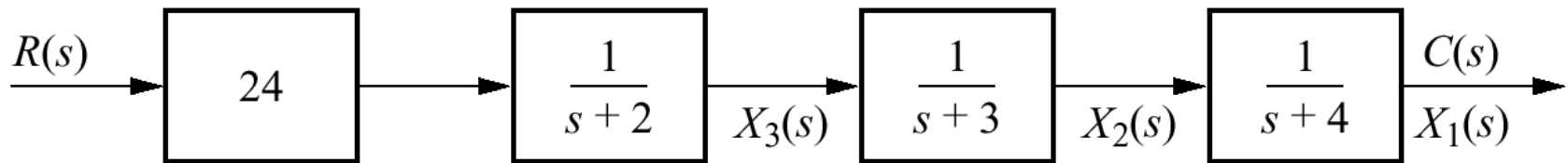
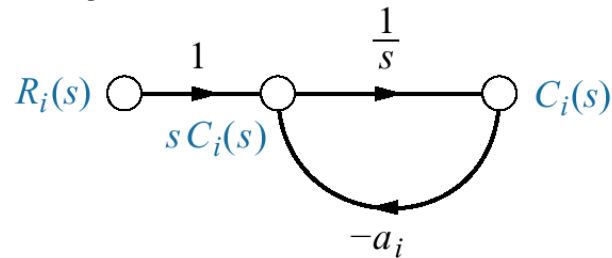
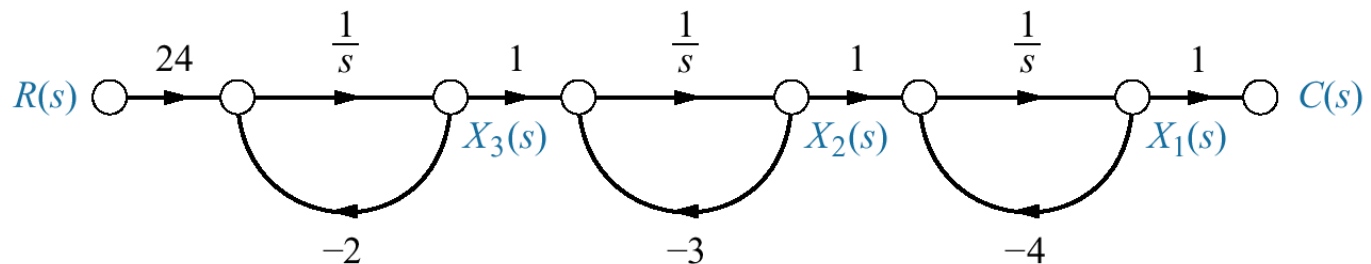


Figure 5.24

- a. First-order subsystem;
- b. signal-flow graph for Figure 5.23 system

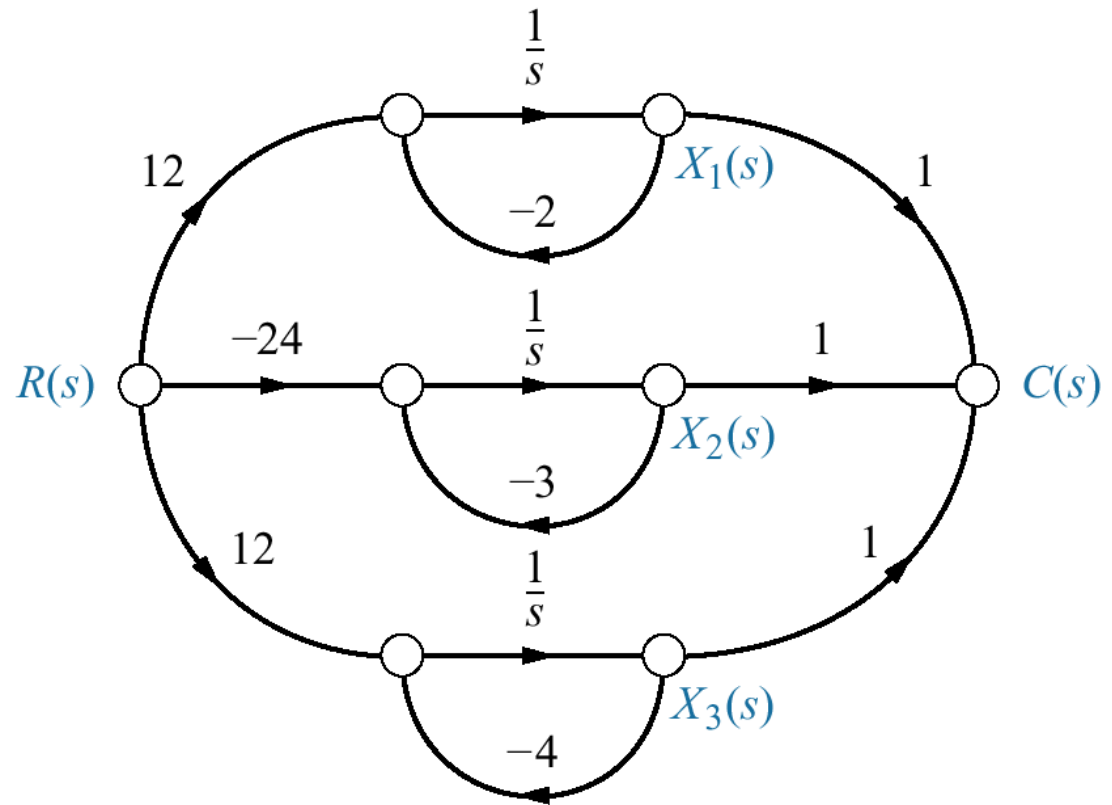


(a)



(b)

Figure 5.25
 Signal-flow
 representati
 on
 of Eq. (5.45)



Figure

5.26

Signal-flow
representat
ion
of Eq.
(5.52)

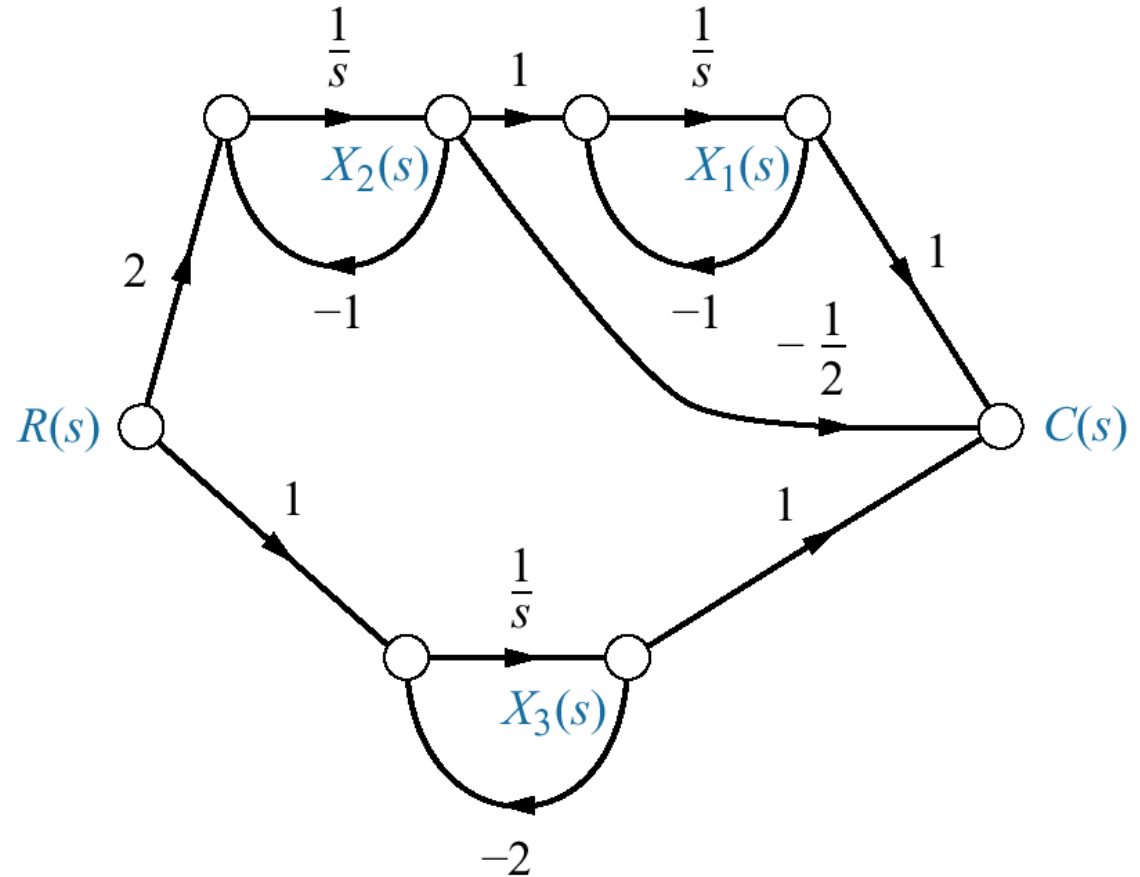


Figure 5.27

Signal-flow graphs for obtaining forms for
 $G(s) = C(s)/R(s) = (s^2 + 7s + 2)/(s^3 + 9s^2 + 26s + 24)$:

- a. phase-variable form;
- b. controller canonical form

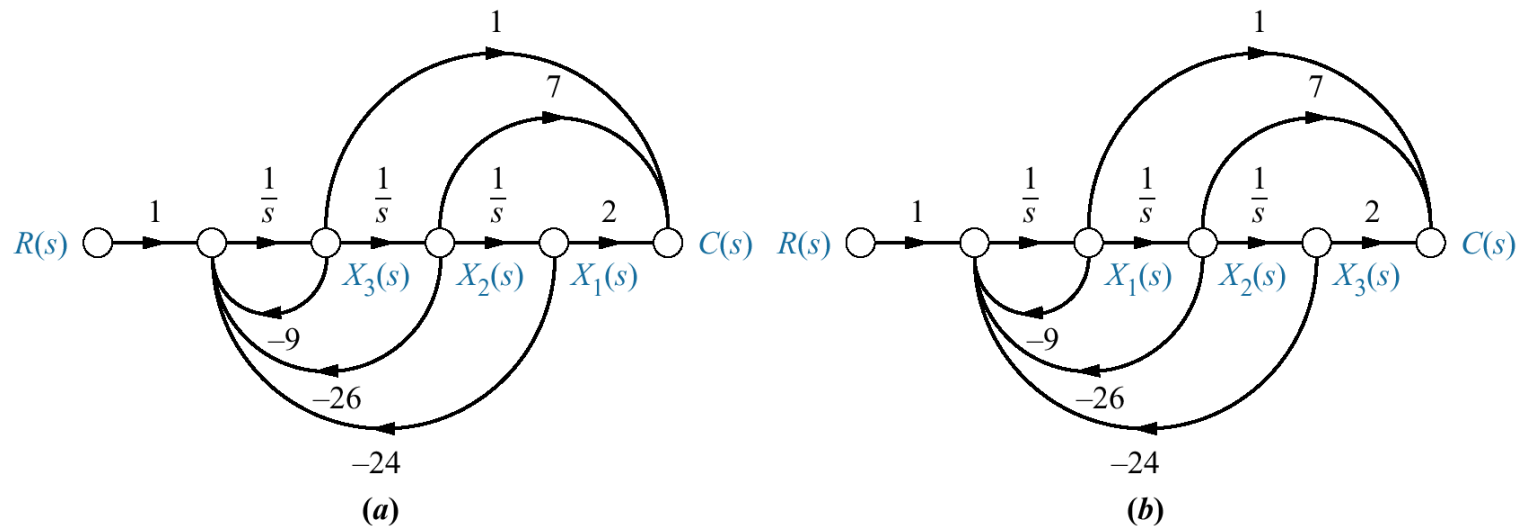
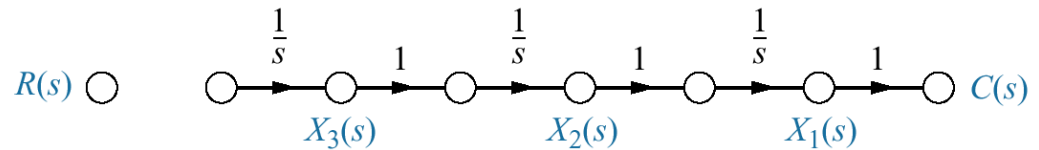
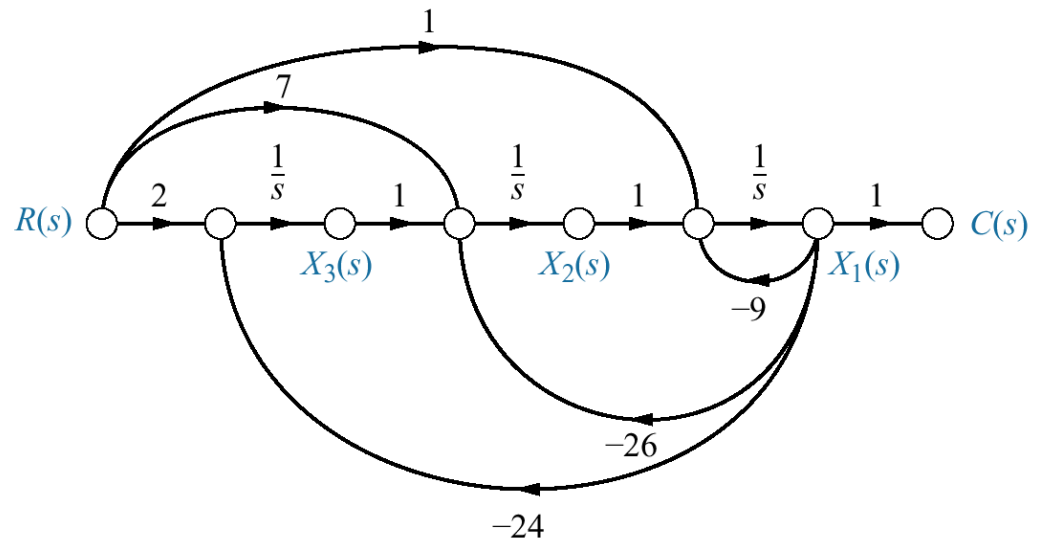


Figure 5.28

Signal-flow graph for observer canonical form variables:
a. planning;
b. implementation



(a)



(b)