1-01-d – Tutorial

Question 1

8.6. Construct a signal flow graph for the simple resistance network given in Figure 8-13.

$$i_1 = \left(\frac{1}{R_1}\right)v_1 - \left(\frac{1}{R_1}\right)v_2 \qquad v_2 = R_3 i_1 - R_3 i_2 \qquad i_2 = \left(\frac{1}{R_2}\right)v_2 - \left(\frac{1}{R_2}\right)v_3 \qquad v_3 = R_4 i_2$$

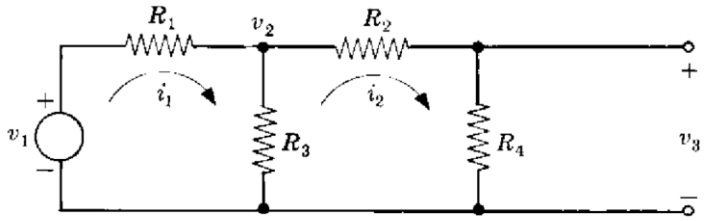

Fig. 8-13

Question 2

Find the transfer function.

EXAMPLE 8.8. The signal flow graph of the resistance network of Example 8.6 is shown in Fig. 8-17. Let us apply Equation (*8.2*) to this graph and determine the voltage gain $T = v_3/v_1$ of the resistance network.

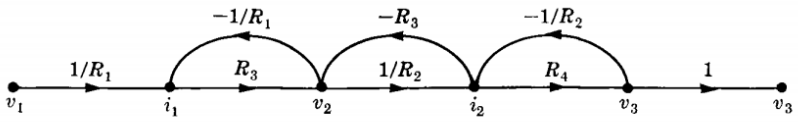

Fig. 8-17

Question 3

Find the transfer function.

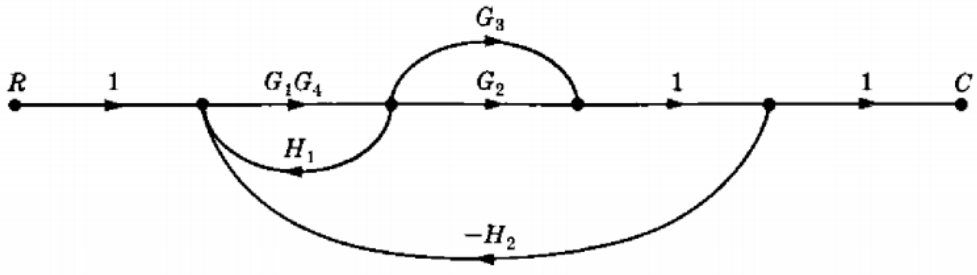

Fig. 8-26

Question 4

8.7. Construct the signal flow graph for the following set of simultaneous equations:

$$x_2 = A_{21}x_1 + A_{23}x_3 \qquad x_3 = A_{31}x_1 + A_{32}x_2 + A_{33}x_3 \qquad x_4 = A_{42}x_2 + A_{43}x_3$$

Question 5

8.4. Consider the signal flow graph given in Fig. 8-34.

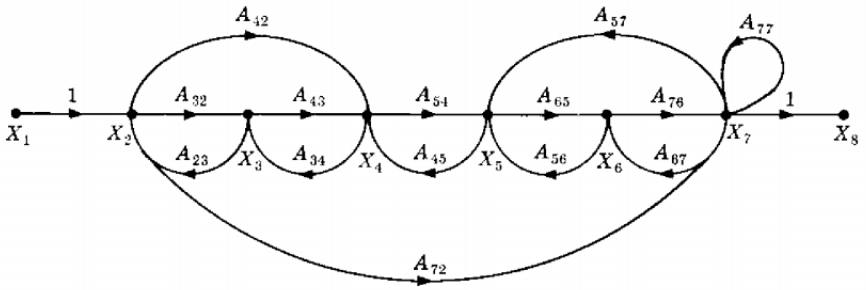

Fig. 8-34

Identify the (a) input node, (b) output node, (c) forward paths, (d) feedback paths, (e) self-loop. Determine the (f) loop gains of the feedback loops, (g) path gains of the forward paths.