**1)** Consider the system defined by

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$
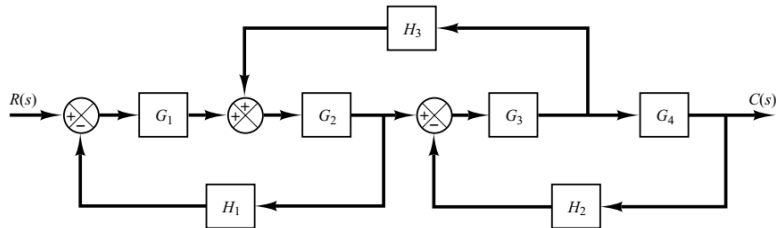
$$y = \begin{bmatrix} c_1 & c_2 & c_3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Except for an obvious choice of $c_1=c_2=c_3=0$, find an example of a set of c_1, c_2, c_3 that will make the system unobservable.

2) Obtain the transfer function $E_o(s)/E_i(s)$ of the electrical circuit shown in Figure
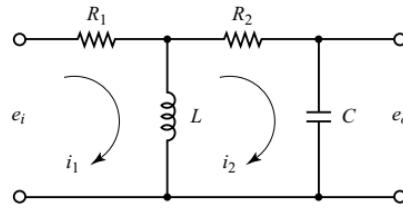
3) Simplify the block diagram shown in Figure 2–21. Then obtain the closed-loop transfer function C(s)/R(s).

4) Draw the signal low graph of the following electrical circuit and find its transfer function using Mason's gain formula.