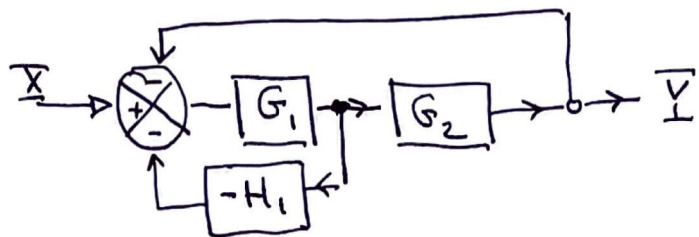


1. Consider the system

(a) Express the system as SFG



(b) Determine Y/X using Mason's gain formula

2. Given the ODEs

$$\dot{x}_1 = x_2$$

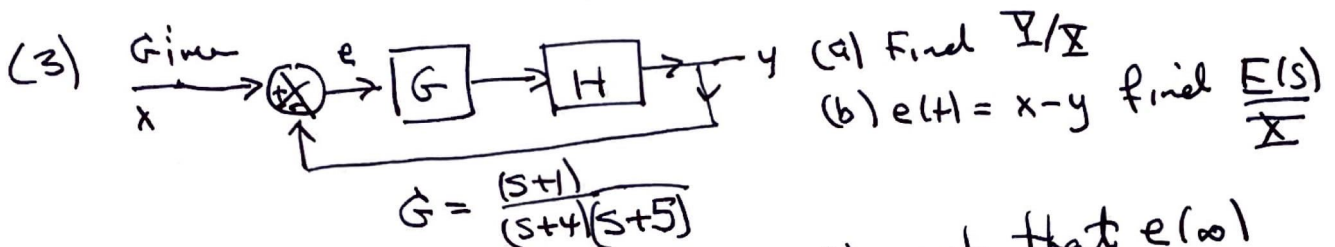
$$\dot{x}_2 = x_3$$

$$\dot{x}_3 = -6x_1 - 11x_2 - 6x_3 + u$$

where $u(t)$ is the input.

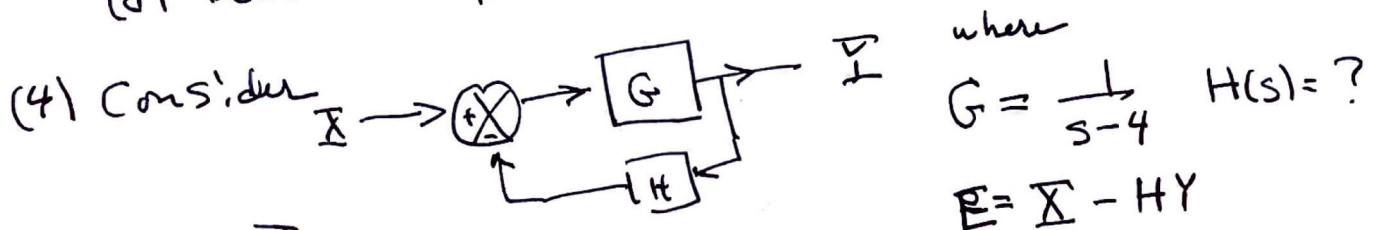
(a) Draw the signal flowgraph of the system.

(b) Find $X_1(s)/U(s)$ using Mason's gain formula



(c) Given $x(t) = tu(t)$ find $H(s)$ such that $e(\infty) = 0$

(d) Determine if your result yields a stable system



(a) Find Y/X

(b) Find E/X

(c) ~~Find $e(\infty)$~~ given $x(t) = u(t)$. find $H(s)$ such that $e(\infty) = 0$

(d) is the system stable