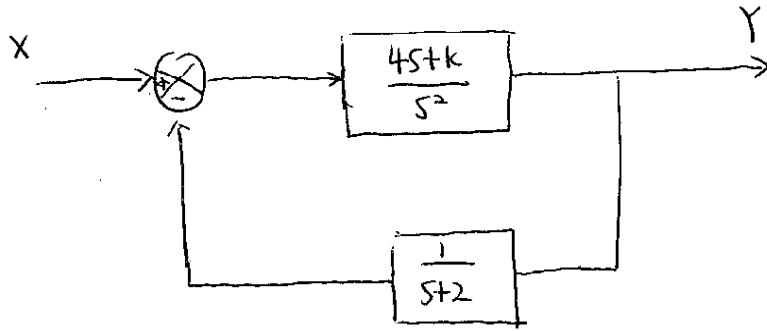


1.] For the negative-feedback system.



(a): what's the transfer function of the closed-loop system.

(b): Find the characteristic equation of the closed-loop system.

(c): Determine the condition on the gain k for stability.

(d): Can the system become marginally stable? If so for what value of k and what is the frequency of oscillation.

2.] Consider unity feedback system having the open-loop transfer function

$$G(s) = \frac{k(s+5)}{s(Ts+1)(2s+1)}$$

(a) Determine the closed-loop transfer function and characteristic equation of the system

(b): Using the characteristic equation determine the conditions on T and k for which the system is stable.

3. Determine the range of k for stability of a unity-feedback control system whose open-loop transfer function is:

$$G(s) = \frac{k}{s(s+1)(s+2)}$$