

1. 試舉例並說明如何測定一個控制系統之 (25%) 時域規格。

2. 請闡述系統極點與零點配置對系統暫態 (25%) 響應之影響。

(12%) 3. Explain the following terms:

- a) BIBO Stable (3%)
- b) Routh-Hurwitz criterion (3%)
- c) characteristic equation (3%)
- d) gain margin and phase margin (3%)

(18%) 4. Sketch the root locus of the negative feedback systems having the open-loop transfer functions $kG(s)H(s)$ given by the following functions. Solve for the values of s at any crossings of the imaginary axis.

- a) $\frac{k}{(s+4)(s^2+8s+20)}$
- b) $\frac{k(s^2+9)}{s(s^2+36)}$

(20%) 5. a) Apply the Nyquist theorem for the negative feedback system shown in Fig. 1, and determine the stability condition for k . (10%)
 b) Apply the Nyquist theorem for the positive feedback system shown in Fig. 2, and determine the stability condition for k . (10%)

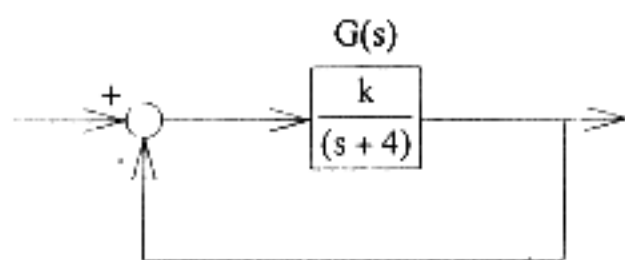


Fig. 1

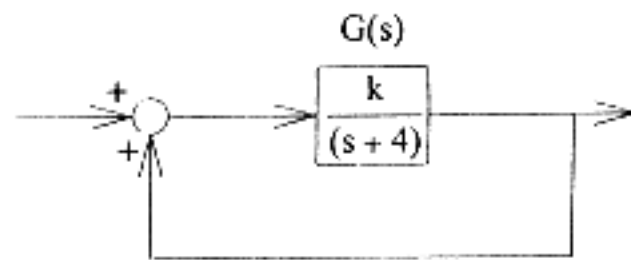


Fig. 2