

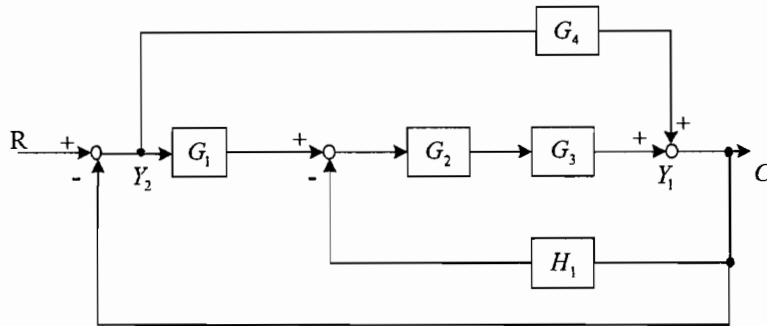
國立台灣科技大學九十六學年度碩博士在職專班招生試題

系所組別：電機工程系碩士在職專班乙組

科目：控制工程

(總分 100 分)

1. Assume that the block diagram of the system are shown as below, find the transfer

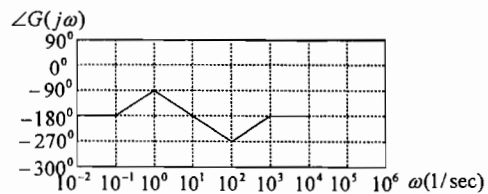
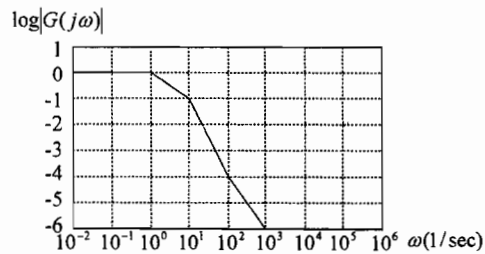
function $\frac{Y_1(s)}{Y_2(s)}$. (15%)

2. (a) Draw the Root Loci of the second-order system:

$$s(s+3) + k(s+5) = 0 \quad (10\%)$$

- (b) Find the breakaway points of the Root Loci. (10%)

3. Find the open-loop transfer function of
- $G(s)$
- . (15%)



國立台灣科技大學九十六學年度碩博士在職專班招生試題

系所組別：電機工程系碩士在職專班乙組

科 目：控制工程

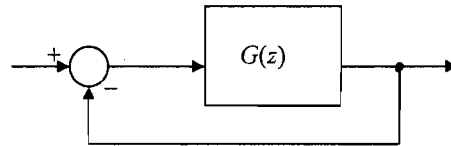
4. Consider a system described as the transfer function

$$Y(s) = \frac{1}{s^3 + a_2 s^2 + a_1 s + a_0}$$

Prove or disprove that this system is controllable. (15%)

5. Find the Z-transform for $f(t) = \sin \omega t$ for $t \geq 0$. (15%)
6. Consider the following closed-loop system:

$$G(z) = \frac{K(az + b)}{z^2 - (1+a)z + a}$$



- Where $a=0.3678$, and $b=0.2644$. Prove or disprove that this system is stable if
 (a) $K=1$, (b) $K=10$. (20%)