國立中央大學98學年度碩士班考試入學試題卷

所別：電機工程學系碩士班 系統與生醫組(一般生)　科目：控制系統　共 2 頁 第 1 頁
系統與生醫組(學位在職生)　＊請在試卷答案卷（卡）內作答

1. **The Nyquist diagram of the following loop gain transfer is given in Figure 1 for some gain K**

$$G(s)=\frac{K(s+T_1)^2}{(s+T_2)(s+T_3)(s+T_4)(s+T_6)^2}$$

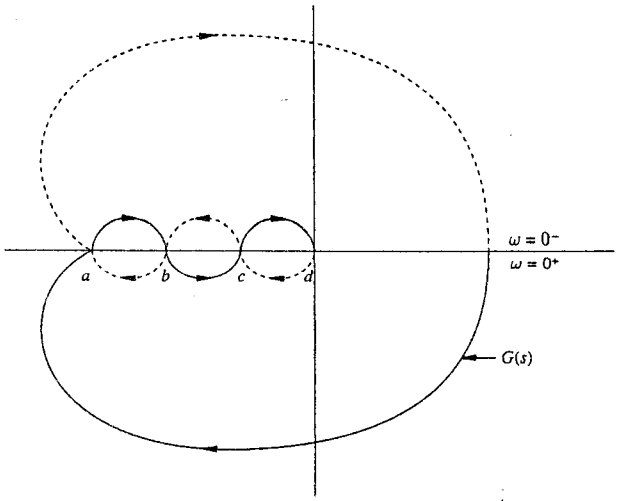


Figure 1

The diagram assumes $T_5 > T_1 > (T_2, T_3, and\ T_4) > 0$. **Fill out the following blanks given the ranges of locations of the -1 point.**

(1). There are _____ right half-plane loop gain poles.(1%)

Ranges where -1 Point is found	Number of clockwise encirclements of -1	Closed-loop system is stable or unstable?
(2). To the left of a	( )	( )(6%)
(3). Between a and b	( )	( )(6%)
(4). Between b and c	( )	( )(6%)
(5). Between c and d	( )	( )(6%)

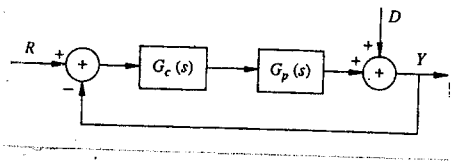
2. **Use the Routh-Hurwitz criterion to decide for what values K the closed-loop systems corresponding to the following open-loop transfer functions are stable.(25%)**

$$G(s)=\frac{K(s+3)}{(s+1)(s^2+3s+10)(s+10)}$$

注音：背面有試題

參考用

3. As shown in the following figure, find the sensitivity of the closed-loop response to changes in the plant transfer function (15%), and find the response to output disturbances for the series compensator configuration when $G_c(s)$ is large.(10%)



Figure

4. Given the transfer function of a system

$$G_p(s)=\frac{s+1}{s(s-1)(s+20)}$$

For this system, answer the following questions.

(1)The number of excess pole is _____.(5%)

(2)The origin of the asymptotes is _____.(5%)

(3)The angles that the asymptotes make with the real axis are _____.(5%)

(4)The locus crosses the imaginary axis when K is _____.(5%)

(5)Breakaway points : _____.(5%)

參考用

注意：背面有試題