| 大葉大學 九十二 學年度 研究所碩士班 招生考試試題紙 | | | | | |
|---|---|---|---|---|---|
| 系 所 別 | 組 別 | 考 試 科 目 (中文名稱) | 考試日期 | 節 次 | 備 註 |
| 機電自動化研究所 | 甲組 | 自 動 控 制 | 4月13日 | 第二節 10:30～12:00 | 共二頁 P2-1 |

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

**1.** Given the root locus shown in Figure 2.

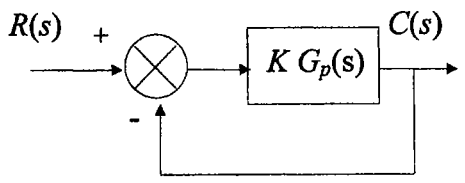



Figure 1

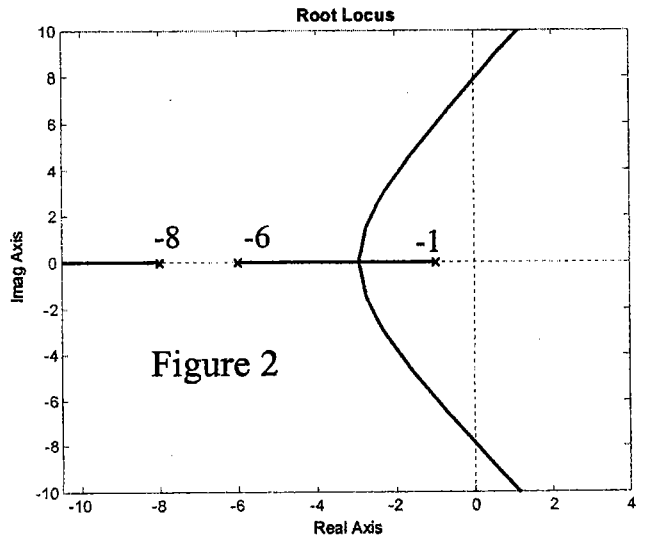



Figure 2

**a.** Find the open-loop system $G_p(s)$, if the system is shown as in Figure 1. (5%)

**b.** Find the break-away point, and the corresponding gain $K$. (10%)

**c.** Find the three asymptotes: angles and intersection in the real axis. (5%)

**2.** As in problem 1,

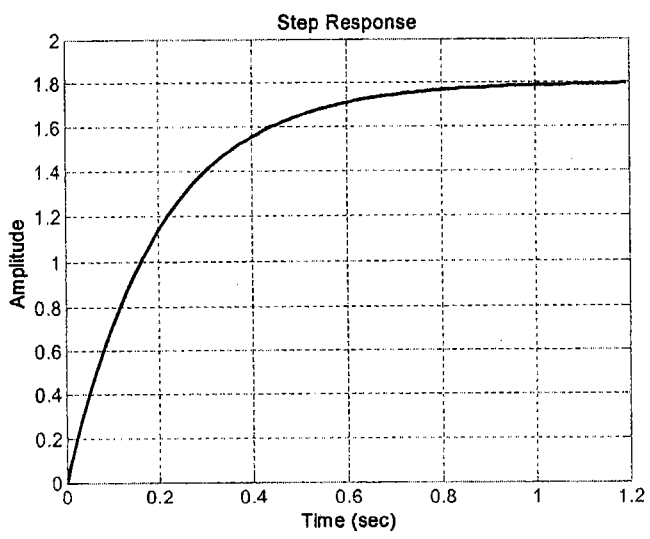
**a.** Find the value of gain that will make the system marginally stable and also the $j\omega$-crossing points. (10%)

**b.** Find the value of gain that will make the system step response with %OS=15%. (10%)

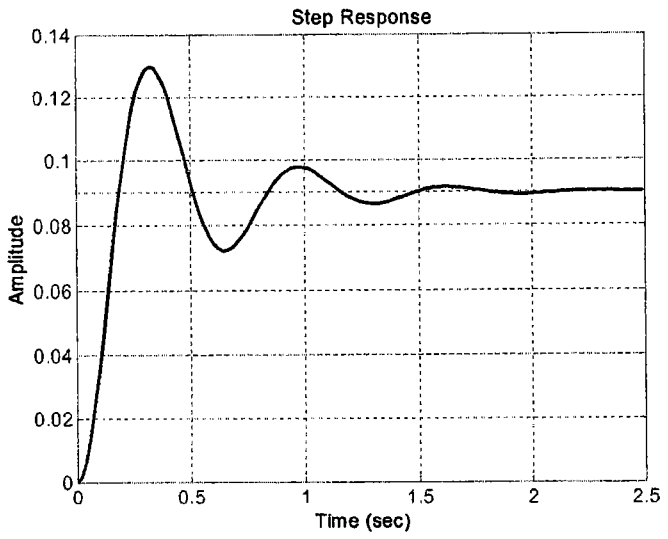
**3.** For each of the **unit step response** shown below, find the parameters in the transfer function of the system

(a) $G(s)=\dfrac{k}{s+a}$ (5%)

(b) $G(s)=\dfrac{k}{s^2+2\zeta\omega_n s+\omega_n^{\,2}}$ (15%)




System (a)




System (b)

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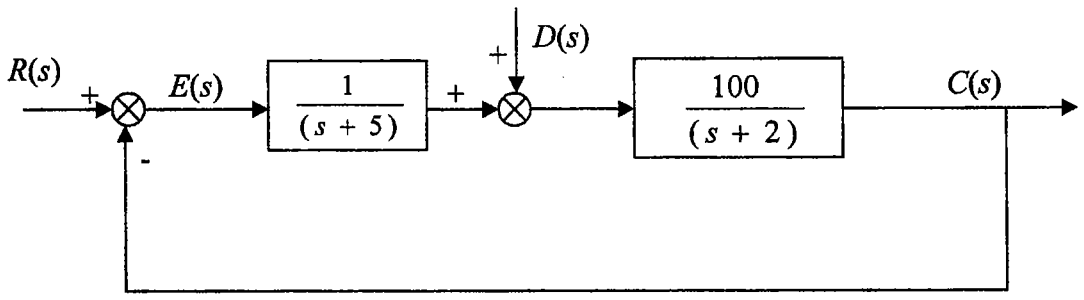
**4.** For the system below




(a) Derive the output $C(s)$ in terms of $R(s)$ and $D(s)$. (10%)
(b) When $R(s)$ and $D(s)$ are unit-step functions, what is the total steady-state error. (10%)

**5.**

(a) There are three second order systems and their pole locations are shown as below(right figure). Find out the corresponding time response in the left figure. Explain why!! (10%)
(b) What specifications in the transient response are the same for these three systems? (10%)