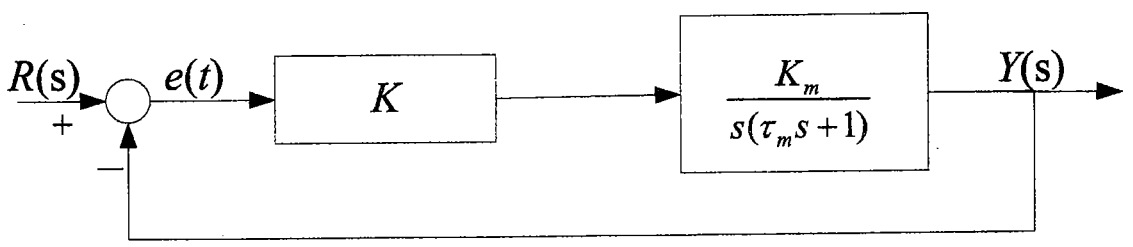
大葉大學 95 學年度 研究所碩士班 招生考試試題紙					
系 所 別	組 別	考 試 科 目 (中 文 名 稱)	考 試 日 期	節 次	備 註
電機工程所	乙組	系統理論(控制領域)	4 月 23 日	第 三 節 13:30 ~ 15:00	共二頁 P2-1

註：本試卷共有十題 1~5 題屬於控制領域，6~10 題屬於計算機領域，考生只能選其中一領域之題目作答，不可跨領域作答）

1. Please give the following definition. (20%)
   (1) Linear time-invariant (LTI) system
   (2) Transfer function
   (3) Damping ratio and undamped natural frequency
   (4) Gain margin, phase margin
   (5) Minimum phase system and Nonminimum-phase system
2. Consider the control system shown the following block diagram. If we wish to design a plotter system using the above block diagram with $\zeta = 1$ (damping ratio), and $T_s = 1\text{sec}$ (settling time). Suppose that there are three servomotors with different parameters as：

   Servomotor A： K_m=0.25，$\tau_m = 0.5$
   Servomotor B： K_m=1.0 ，$\tau_m = 0.1$
   Servomotor C： K_m=0.5 ，$\tau_m = 1.25$

   Which motor (or motors) can we choose (10%) and what is the amplifier gain? (10%)

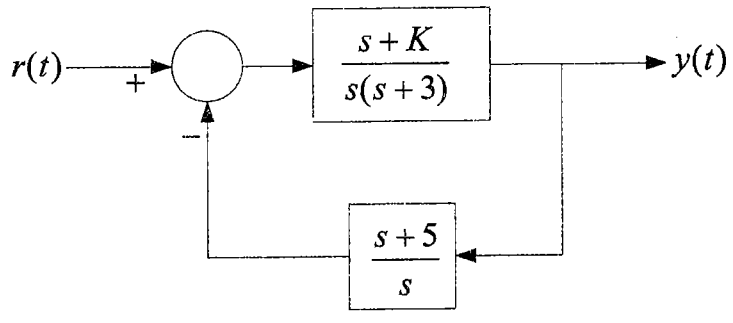


3. A closed-loop system with unity feedback has a transfer function

$$T(s) = \frac{10(s+1)}{s^2+2s+10}$$

(a) Determine the open-loop transfer function $G(s)$.(5%)
(b) Draw the Bode diagram of $G(s)$ roughly, including magnitude and phase vs. frequency with semi-log scale for the frequency axis.(15%) (Given $20\log 0.125 = -41.59$, $20\log 1.25 = 1.94$, and $20\log 12.5 = 50.14$)

4. (1)Please plot the root loci of the following system for $K \geq 0$ (15%) (given $\angle(3+j) = 18.4°, \angle(-2+j) = 153.4°$)
   (2)Find the range of K for which the closed-loop system is stable (5%).



5. For a linear time-invariant plant, its state equation is given

$$\dot{x}(t) = \begin{bmatrix} 0 & 1 & -1 \\ -6 & -11 & 6 \\ -6 & -11 & 5 \end{bmatrix} x(t) + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u(t)$$

   (1) Please find the eigenvalues and associated eigenvectors of LTI plant (15%)
   (2) Find its state transition matrix(5%)

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電機工程所	乙組	系統理論(計算機領域)	4 月 23 日	第 三 節	P2-2

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） 13:30～15:00

6. Please give the following definition. (20%)
   (1)TCP/IP
   (2)Firmware
   (3)Utility program and object program
   (4)Compiler and interpreter
   (5)Storage interleaving
7. (1)What are Call-by-Value, Call-by-Name, and Call-by-Address? (15%)
   (2)Please address the difference among them.(5%)
8. Please use a programming language to design an algorithm to calculate the total and mean score of entrance examination for 50 examinees.(20%)
9. (1)What are deadlock and race? Please explain them. (10%)
   (2)Why does deadlock take place and how can you do with this problem? (10%).
10. $0100\ 1001\ 0110_{BCD}$ = _____$_{10}$ = _____$_{16}$ = _____$_{8}$ = _____$_{2}$ (20%)