| 大葉大學 九十四 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
電機工程學系碩士班	乙　組	系統理論(控制)	3 月 27 日	第 三 節 13:30~15:00	可帶不可程 式計算機

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）

每題 20 分，各小題分數相同　　請注意 控制 與 計算機 二者只能擇一類作答，不可混合選答

1. Given a feedback control system shown below
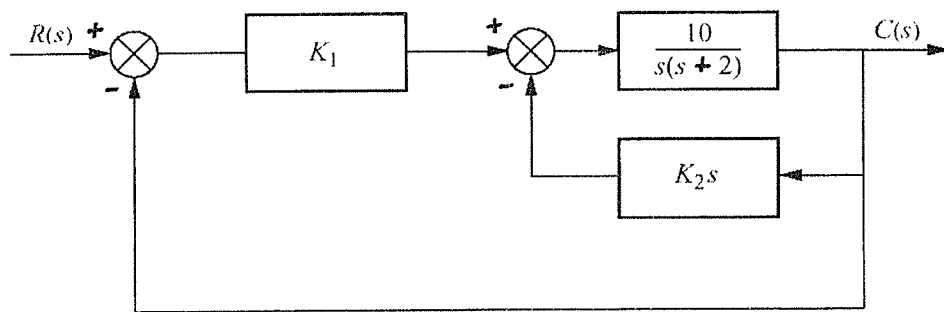
Find the values of K_1 and K_2 to yield a peak time of 1 second and a settling time of 2 seconds for the closed-loop system's step response.

2. **What are transfer functions of Out1(s)/In1(s) and Out1(s)/In2(s)?**
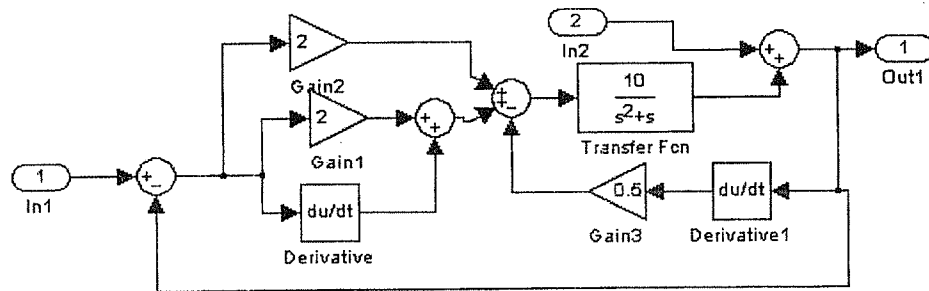
3. **A given CT (continuous time)controller is C(s)=(s+2)/[s(s+1)]. What is discrete equivalent DT (discrete time) controller by using Tustin transformation with a sampling frequency of 10 Hz?**
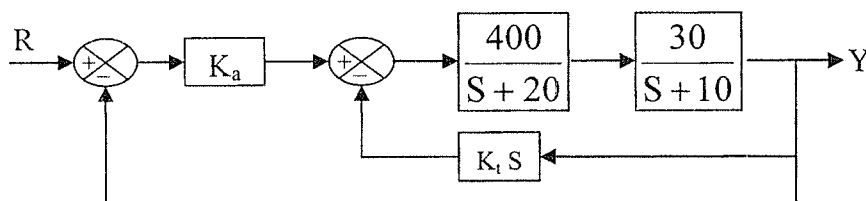
4. **Given the system shown below**

$$\begin{bmatrix} \dot{X_1} \\ \dot{X_2} \\ \dot{X_3} \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & -10 & 4 \\ 0 & 0 & -100 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 100 \end{bmatrix} U$$

$Y=X_1$, $U=10(r-X_1)$　　　　　where r is the reference input

(a). Draw a block diagram for the System

(b). Check the system stability by Routh Criterion

5. **Given a feed back control system as shown below**

If r(t)=10U_s(t), where U_s(t) is unit step function

(a).What is the value of k_a for error steady state $e_{ss}=0.2$

(b).From part (a), find k_t so that the system has critical damping (i.e. $\zeta=1$).

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1. **Explain the following terms:**
    (a) Hardware Description Language
    (b) Context Switch
    (c) Network Topology

2. Suppose that we want to determine how many of the bits in a three-bit unsigned number are equal to 1. Design the circuit by using a full-adder circuit.

3. (a) Find a simplified sum-of-products form for $F(A, B, C, D) = \sum m(0, 2, 4, 5, 7, 8, 9, 15)$
   (b) Find a simplified product-of-sums form for $F(A, B, C, D) = \sum m(0, 1, 2, 5, 8, 9, 10)$

4. Add the following two numbers in 32-bit IEEE format, and the exponent part is represented by Excess_127 system. (20%)
   0 10000110   10110100000000000000000
   0 10000011   01101000000000000000000
   Note: The result must be represented in 32-bit IEEE format.

5. Suppose an 8-bit data word stored in memory is 11000010. Using the Hamming algorithm, determine what check bits would be stored in memory with the data word. Show how you get your answer. (20%)