



Islamic University of Gaza
Electrical Engineering Department
EELE 3360 Control Systems
Final Exam
May, 25, 2013

Dr. Basil Hamed

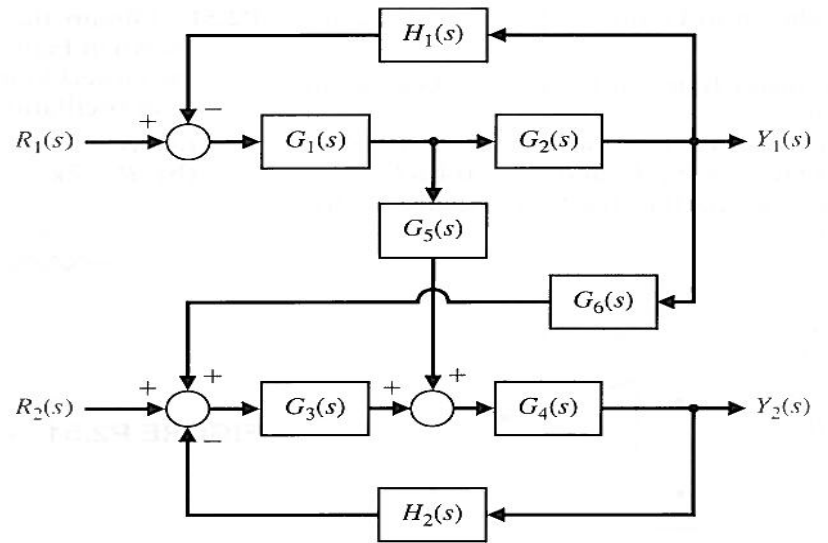
Exam Time 12:00-2:00

Name	
Student ID	
Grade	

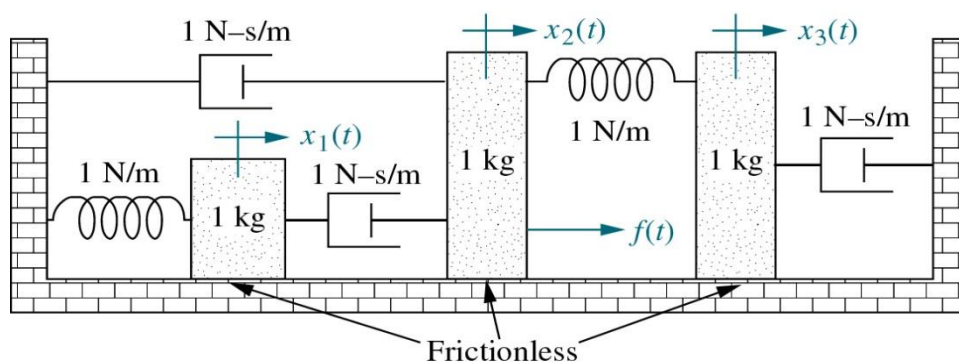
GOOD Luck

1. For given system in the figure, find $\frac{Y_2}{R_1}$

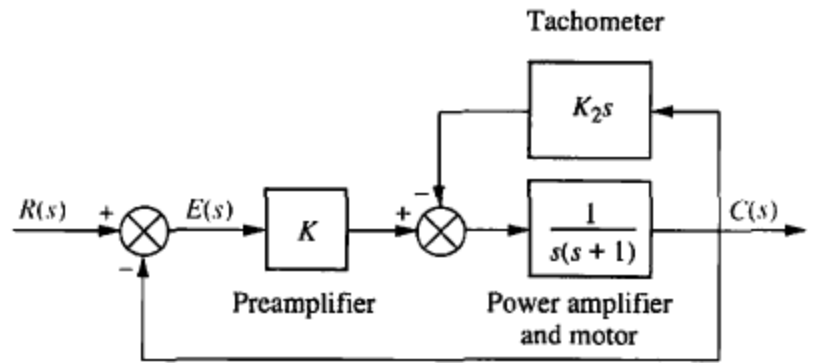
(8 Pt.)



2. Find the transfer function, $G(s) = X_3(s)/F(s)$, for the translational mechanical system shown in Figure. (10 Pt.,)



3. The system shown in Figure below will have its transient response altered by adding a tachometer. Design K and K_2 in the system to yield a damping ratio of 0.69. The natural frequency of the system before the addition of the tachometer is 10 rad/s. (10 Pt.)

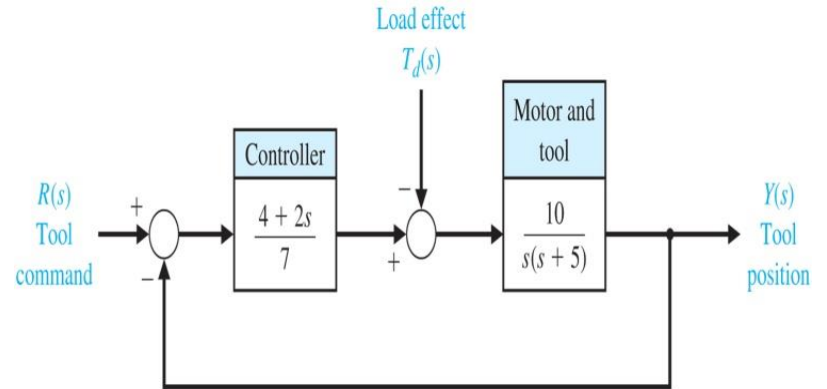


4. A machine tool is designed to follow a desired path so that

$$r(t) = (1-t) u(t)$$

The machine tool control system is shown in the Figure below.

- Determine the steady-state error when $r(t)$ is the desired path as given and $T_d(s)=0$ (5 PT.)
- If the desired input is $r(t) = 0$, find the steady state error when $T_d(t)$ is unit step (5 PT.)



5. For the system shown in the Figure below, do the following:

i. Sketch the root locus.

(5 PT)

ii. Find the $j\omega$ -axis crossing and the gain, K , at the crossing.

(3 PT)

iii. The value of K that yield a stable system with a pair of second order poles have $\zeta=0.707$, $T_s=4$ sec. (4 PT)

