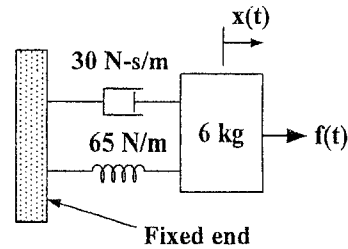
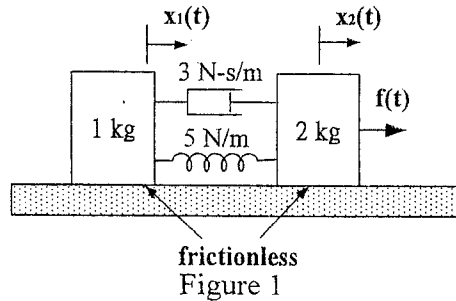


所別	科目	准考證號碼 (請考生填入)	考試日期	節次	第 1 頁 / 共 1 頁
精密機電工程研究所	自動控制		95 年 5 月 7 日	第二節	

1. A two-mass model is shown in Figure 1, find the transfer function  $G(s)=X_1(s)/F(s)$ . (20%)



2. For the system shown in Figure 2.

- (1) Find the transfer function  $X(s)/F(s)$ . (4%)
- (2) Find the damping ratio and the natural frequency. (8%)
- (3) Find the peak time and the settling time for a unit step input. (8%)

Figure 2

3. Given the unity feedback system of Figure 3.

- (1) Sketch the root locus for this system, where  $K$  is from 0 to  $+\infty$ . (10%)
- (2) Find the range of  $K$  that keeps the system stable. (5%)
- (3) Find the value of  $K$  that will make the system marginally stable. (5%)
- (4) Find the frequency of oscillation when the system is marginally stable. (5%)

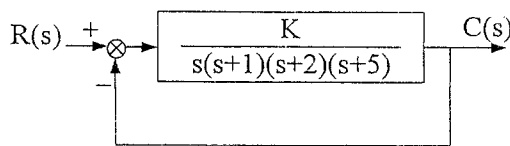


Figure 3

4. Given the closed-loop system of Figure 4. Draw the Bode log-magnitude and phase plots for the system. (15%)

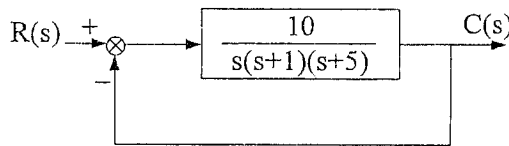


Figure 4

5. Given the control system in Figure 5.

- (1) Find the value of  $K$  to yield the steady-state error of 0.1 for a ramp input of  $15 tu(t)$ . The function  $u(t)$  is the unit step. (10%)
- (2) Find the sensitivity of the steady-state error to changes in parameter  $K$  for the system with a ramp input. (10%)

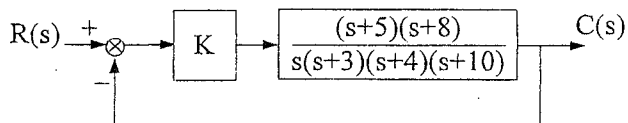


Figure 5