國立中央大學104學年度碩士班考試入學試題

所別：電機工程學系碩士班 系統與生醫組(一般生)　科目：控制系統　共 1 頁 第 1 頁

本科考試禁用計算器　　＊請在答案卷（卡）內作答

參考用

1. Try to determine the response to an input that begins at t=0 as u(t)=cos(100t)1(t), where 1(t) is a unit step function. (20%)

2. Show that the breakup and break-in points for the loot locus can be found by using the relationship

$$\sum_{1}^{m}\frac{1}{\sigma+z_i}=\sum_{1}^{n}\frac{1}{\sigma+p_i}$$

where z_i and p_i are the negative of the zero pole values, respectively, of G(s)H(s), σ is the real value. (20%)

3. Determine the stability of the closed-loop transfer function

$$L(s)=\frac{10}{s^5+2s^4+3s^3+6s^2+5s+3}\quad (20\%)$$

4. Given the transfer function

$$L(s)=\frac{20}{s^8+s^7+12s^6+22s^5+39s^4+59s^3+48s^2+38s+20},$$

tell how many poles are in the right half-plane, (6%) in the left half-plane, (6%) and on the imaginary axis (8%).

5. Given the transfer function

$$L(s)=\frac{C(s)}{R(s)}=\frac{s^2+7s+2}{s^3+9s^2+26s^2+24},$$

derive the phase-variable form (10%) and controller canonical form, (10%) respectively.