國立彰化師範大學 97 學年度碩士班招生考試試題

系所： 機電工程學系碩士班　　　　　組別：甲組　　　　　科目：自動控制

1. Find the step response of each of the transfer functions shown in following equations, make a time response plot for each, and compare them. (30%)

$$G_1(s) = \frac{25}{s^2 + 4s + 25}$$

$$G_2(s) = \frac{25}{(s+10)(s^2 + 4s + 25)}$$

$$G_3(s) = \frac{25}{(s+3)(s^2 + 4s + 25)}$$

2. System response with zeros affect the residue, or said amplitude of a response component but do not affect the natural response. Please pick up an example with transfer function comprised with one zero and two poles. Explain the aforementioned statement with an example. (20%)

   Besides, what's the meaning of nonminimum-phase system? (10%)

3. Make a root locus plot for the system with

   $$\frac{(s-4)}{(s+1)(s+2)(s+3)}$$,and find the gain for marginal stability. (20%)

4. What's the definition of frequency response? (10%)

   How to plot frequency response? (10%)

   Answer above questions based on experiment thinking.