

國立彰化師範大學 99 學年度碩士班招生考試試題

系所：機電工程學系

組別：甲組(選考甲)

科目：自動控制

☆☆請在答案紙上作答☆☆

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1. **Solve** the following differential equation with zero initial conditions. Make the pole-zero plot for this system and **state** the system stability. (20%)

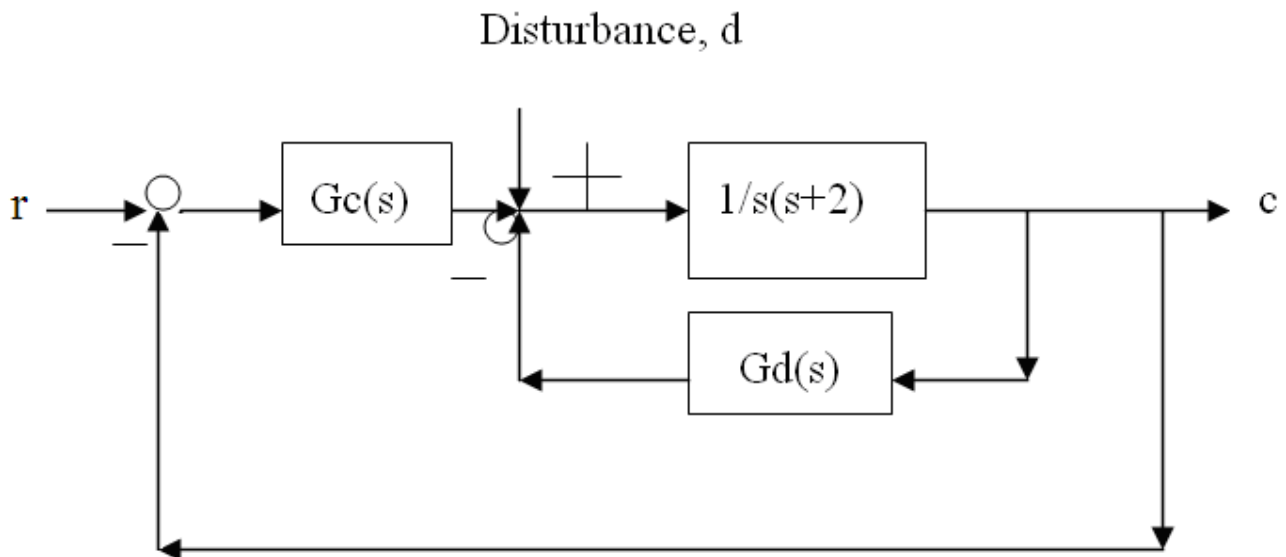
$$\frac{d^2x}{dt^2} + 8\frac{dx}{dt} + 25x = 10$$

2. You are given an open-loop function as follows. Construct the **root locus** and find the **range** of K_p for a stable system. (25%)

$$\frac{0.01K_p}{s(s+2)(s+0.1)}$$

3. With the same third-order system as in Problem 2, make a **Bode diagram** when K_p is 20. [Note: with asymptotes by indicating the slope, phase margins, etc.] (30%)

4.



- (a) **Write** the differential equation relating the two inputs and output.

If the rate feedback controller $G_d(s) = s$, and the feed forward integral controller $G_c(s)$ is K/s . (15%)

- (b) **Find** the value of K when the steady state error caused by the unit ramp disturbance is 0.1. (10%)