

國立臺北科技大學

九十八學年第二學期電機系博士班資格考試

控制系統(大學部)試題

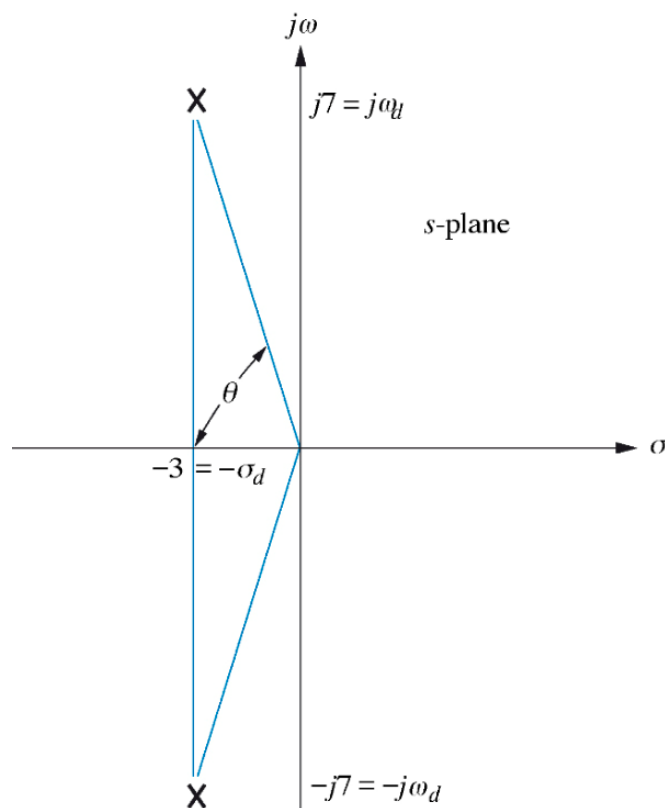
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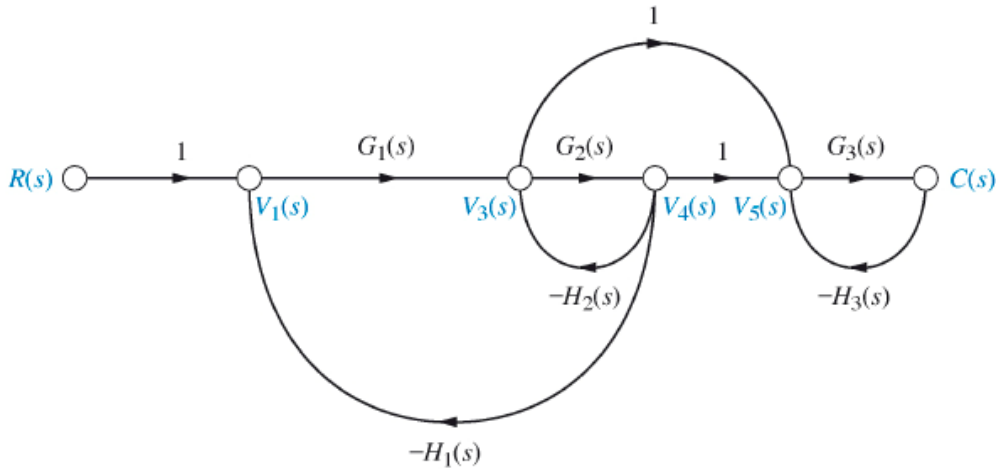
注意事項：

1. 本試題共 5 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間：二小時。
5. 可用計算機。

1. Given the pole plot as shown, find the natural frequency, damping ratio, percent overshoot, and peak time. (20%)

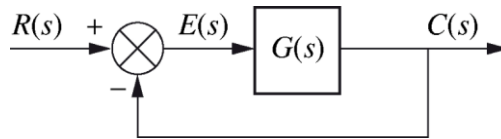


2. Find the transfer function $T(s) = C(s)/R(s)$ of the following system (20%).



3. For the following unity feedback system with $G(s) = \frac{K}{(s+1)^3(s+4)}$,

- a) Find the range of K for stability. (10%)
- b) Find the frequency of oscillation when the system is marginally stable. (10%)



4. For a unity feedback system with the forward transfer function $G(s) = \frac{K(s+12)}{(s+14)(s+18)}$, design the K value to yield a 10% error in the steady state. (20%)

5. Given a unity feedback system with the forward transfer function $G(s) = \frac{K(s+2)}{s^2 - 4s + 13}$,

- a) Sketch the root locus. (10%)
- b) Find the break-in point. (10%)