國 立 臺 北 科 技 大 學

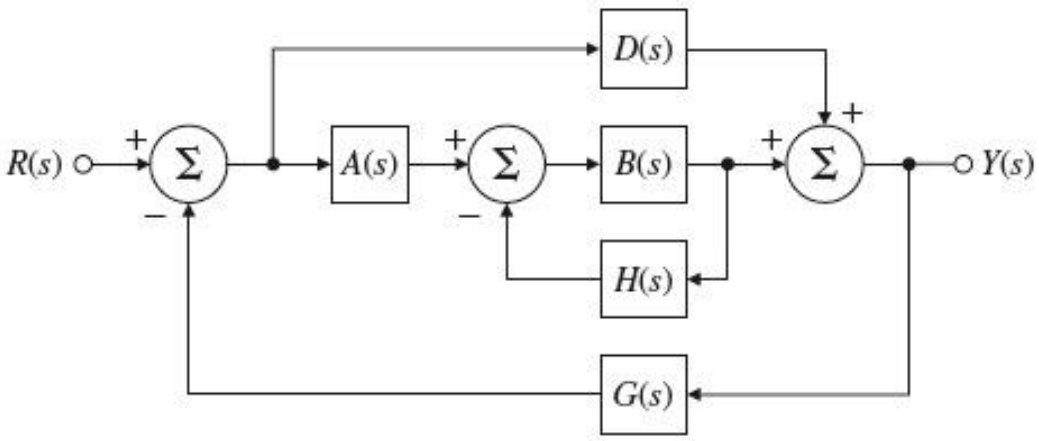
102 學年第一學期電機系博士班資格考試

控制系統(大學部) 試題

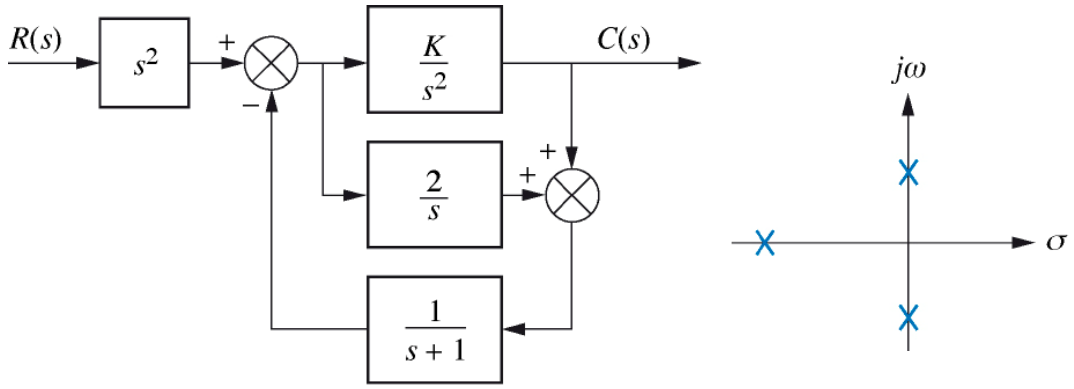
注意事項：

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。

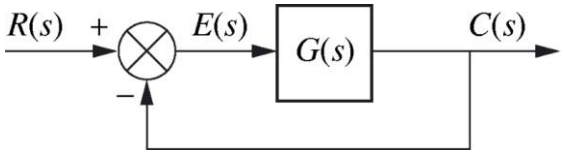
1. (20%) Find the transfer function $T(s) = Y(s)/R(s)$ of the following system.



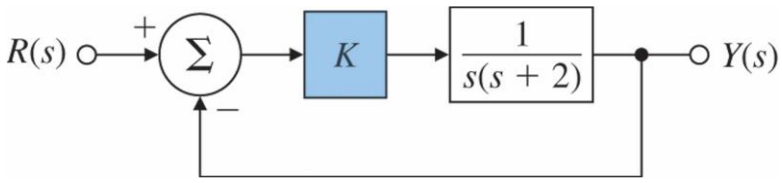
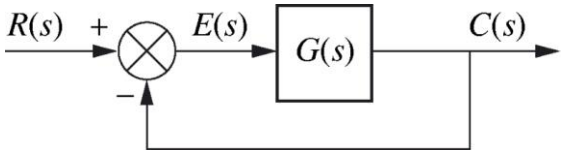
2. (20%) Find the K value in the following system that will place the closed-loop poles as shown.



3. (20%) Sketch the root locus for the unity feedback system with $G(s) = \dfrac{K}{(s+1)^3(s+4)}$



4. (20%) For the unity feedback system, specify the gain K of the proportional controller so that the output $y(t)$ has an overshoot of no more than 10% in response to a unit step.



5. (20%) Sketch the asymptotes of the Bode plot magnitude and phase for a unity feedback system with $G(s) = \dfrac{(s+20)}{(s+1)(s+7)(s+50)}$.