

# Home Work #3

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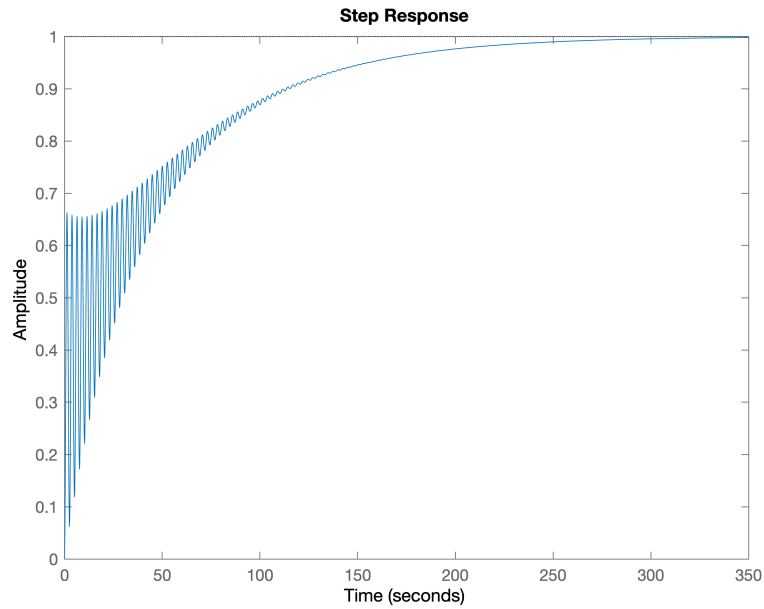
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## 1 Question 1

From root locus we find out with add one real zero we change shape of root locus and with increasing gain system will be stable and without this zero when we increase gain system change better but in some where it goes unstable so with adding just one zero system will work fine and get problem require. For cancelling oscillation we use derivative controller.

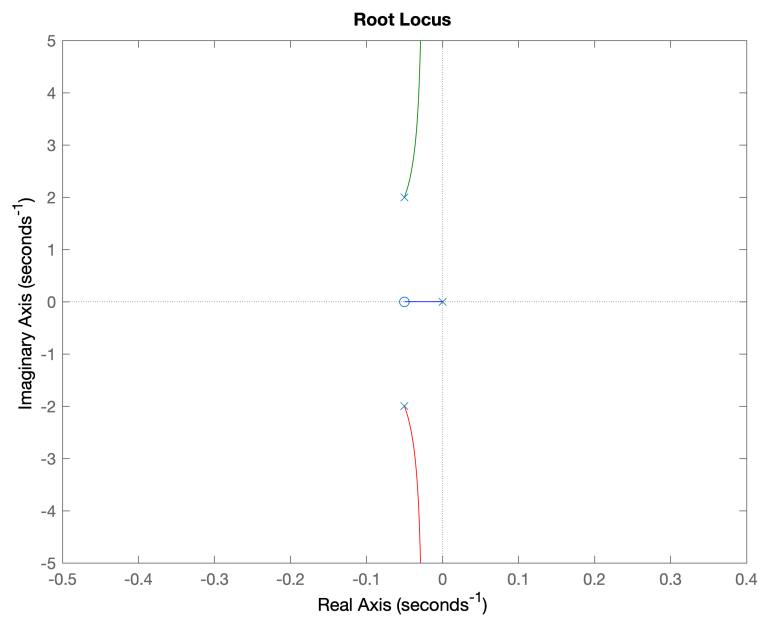
- system step response

Figure 1: system step response



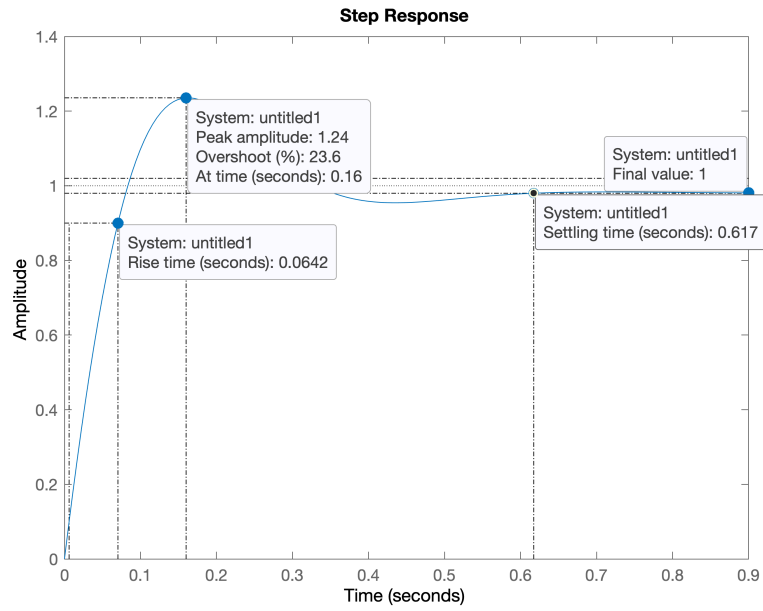
- system root locus

Figure 2: system root locus plot



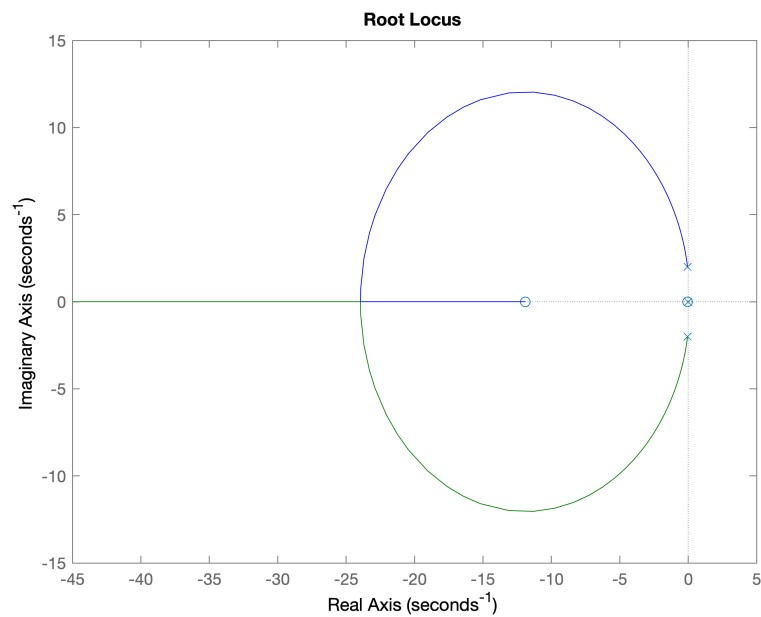
- system with controller step response

Figure 3: system with controller step response



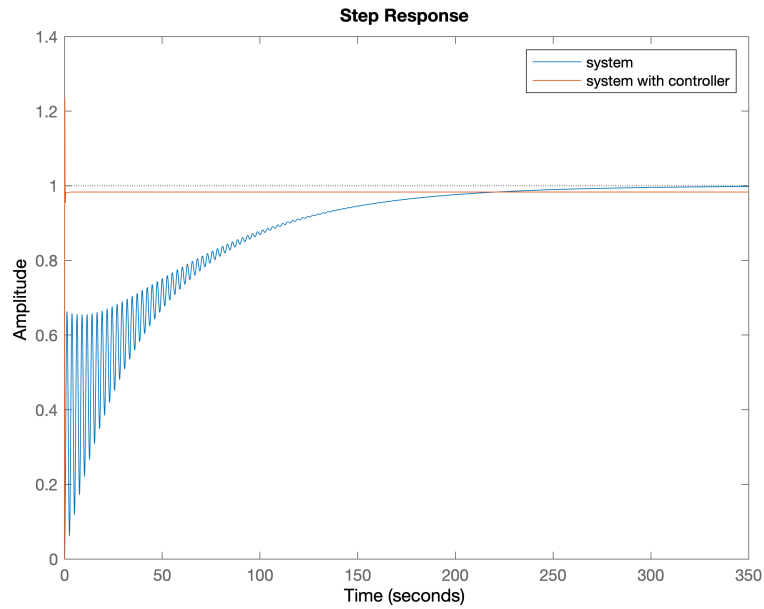
- system with controller root locus

Figure 4: system with controller root locus plot



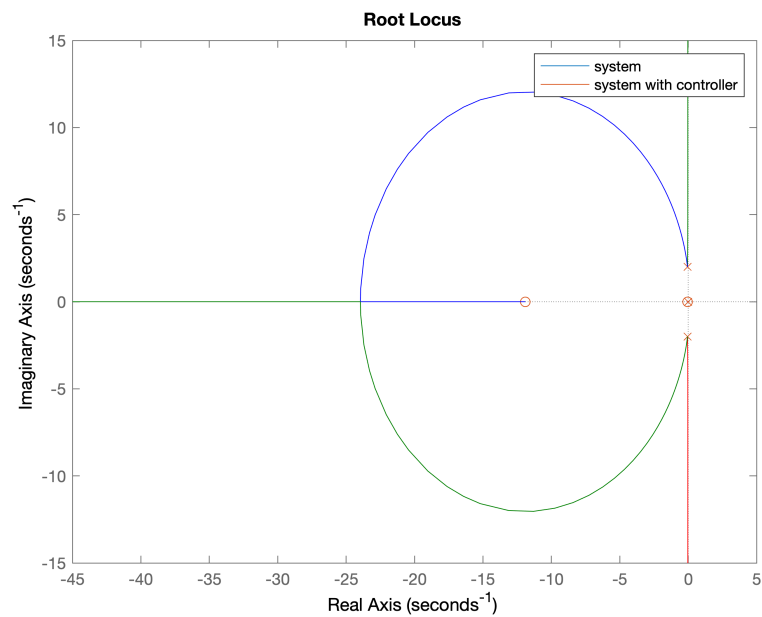
- system with and without controller step responde

Figure 5: system with and without controller step responde



- system with and without controller root locus

Figure 6: system with and without controller root locus plot

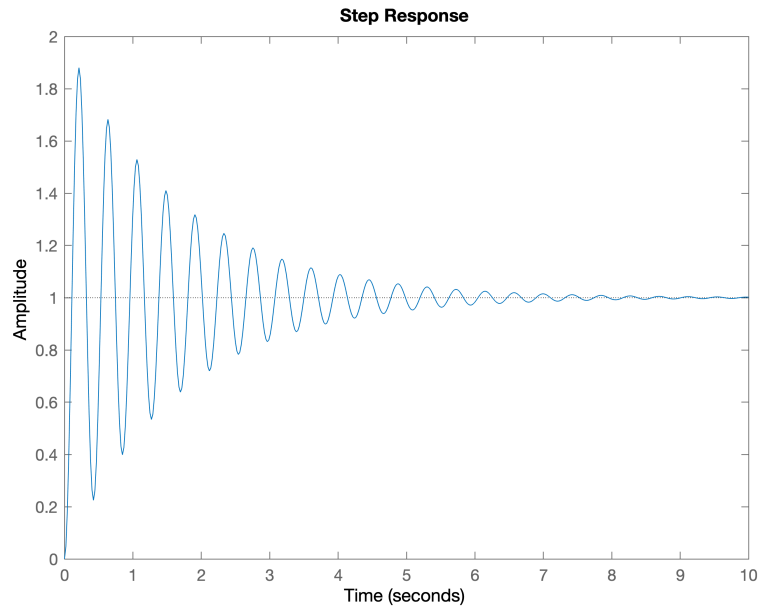


## 2 Question 2

In this problem we must lead and lag controller. We use lead controller to fix transient mode response and use lag controller to fix permanent state response.

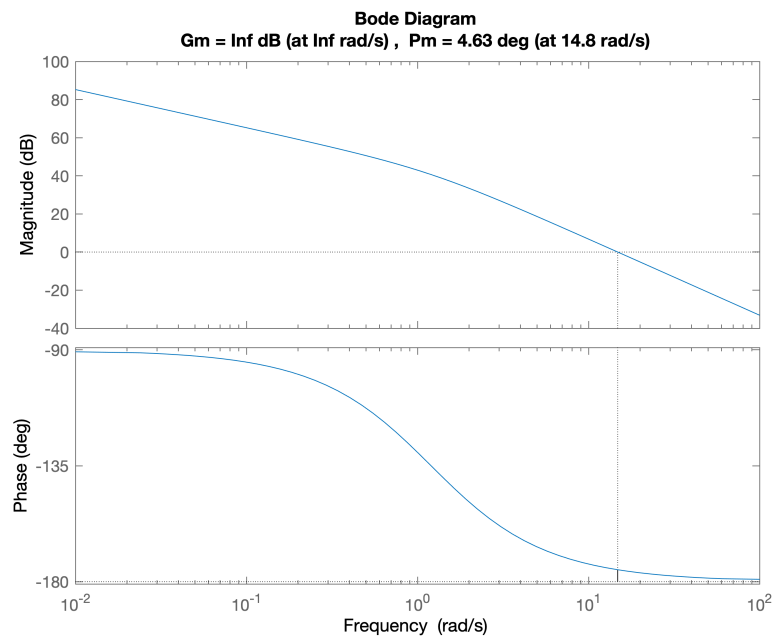
- system step responde

Figure 7: system step responde



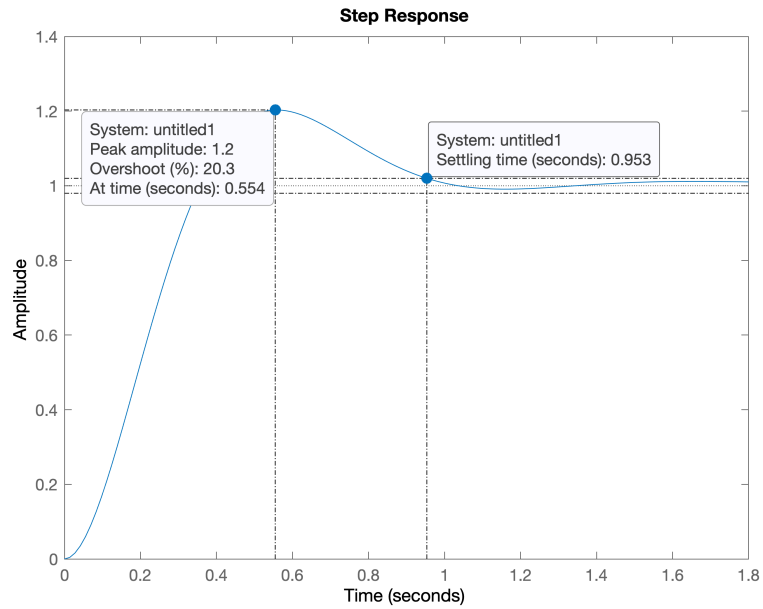
- system bode

Figure 8: system bode plot



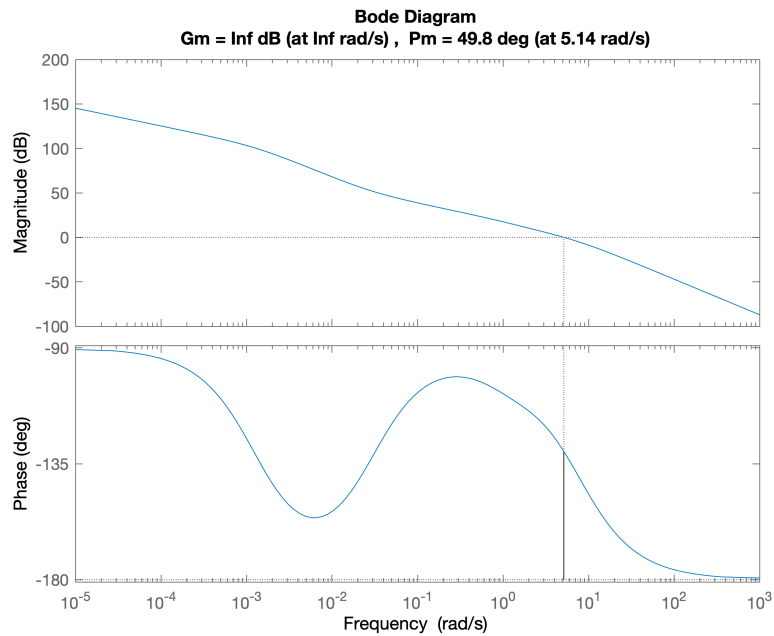
- system with controller step response

Figure 9: system with controller step response



- system with controller bode

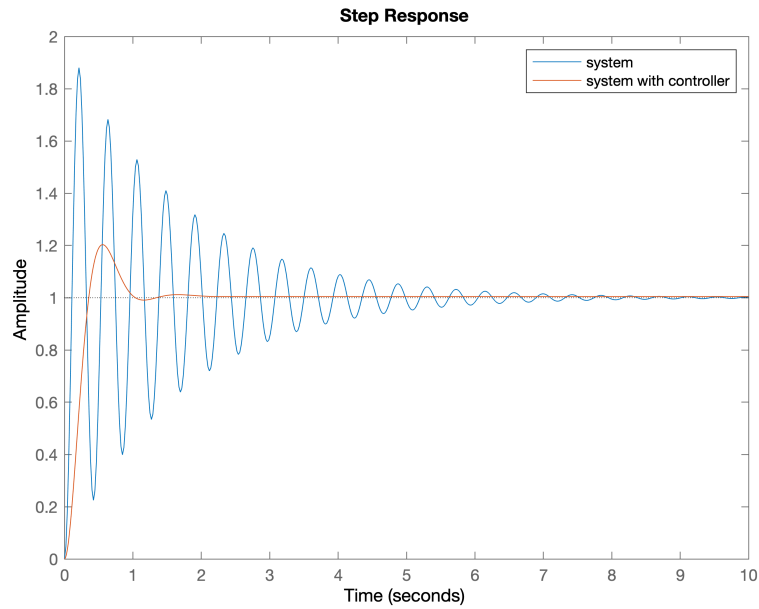
Figure 10: system with controller bode plot





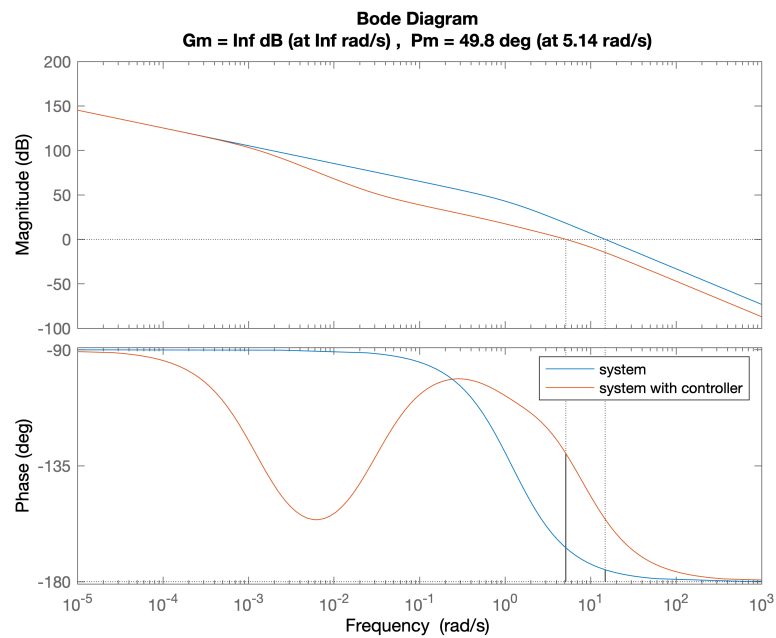
- system with and without controller step responde

Figure 11: system with and without controller step responde



- system with and without controller bode

Figure 12: system with and withou controller bode plot



Q3

Q4

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