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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Control systems (course)

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Unit 13 - Week 11

Assignment 11

The due date for submitting this assignment has passed. **Due on 2019-10-16, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Consider a unity negative feedback closed loop system whose open loop transfer function is $\frac{2(s+8)}{s^2+7s-8}$ The open loop poles are ***1 point***

- -1 and -8
- 1 and -7
- -1 and -7
- 1 and -8

No, the answer is incorrect.
Score: 0
Accepted Answers:
1 and -8

2) In problem 1, the closed loop poles are ***1 point***

- -1 and -8
- 1 and -8
- -1 and -7
- 1 and -8

No, the answer is incorrect.
Score: 0
Accepted Answers:
-1 and -8

3) From problems 1) and 2), one can conclude that the mapped contour of the Nyquist contour in the G(s)H(s) plane (where G(s)H(s) is the open loop transfer function) ***1 point***

- encircles the -1 point once in the counterclockwise direction
- encircles the -1 point once in the clockwise direction
- encircles the origin once in the counterclockwise direction
- encircles the origin once in the clockwise direction

No, the answer is incorrect.
Score: 0
Accepted Answers:
encircles the -1 point once in the counterclockwise direction

4) In problem 1, let the plant transfer function be $\frac{2}{s^2+7s-8}$ Considering unity negative feedback, one can infer that the controller structure is that of a ***1 point***

- proportional controller
- proportional integral controller
- proportional derivative controller
- integral derivative controller

No, the answer is incorrect.
Score: 0
Accepted Answers:
proportional derivative controller

5) Consider a causal LTI system whose open loop transfer function has two poles in the right half complex plane with the remaining poles in the left half complex plane. From the plot of the open loop transfer function's contour corresponding to the Nyquist contour, the corresponding negative feedback closed loop system will be stable only when ***1 point***

- the -1 point is encircled twice in the clockwise direction
- the origin is encircled twice in the clockwise direction

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- the origin is encircled twice in the counterclockwise direction
- the -1 point is encircled twice in the counterclockwise direction

No, the answer is incorrect.
Score: 0
Accepted Answers:
the -1 point is encircled twice in the counterclockwise direction

6) Consider a negative feedback closed loop system whose open loop transfer function is $\frac{s+5}{s^2}$ Then, one can conclude that the mapped contour of the modified Nyquist contour in the G(s)H(s) plane (where G(s)H(s) is the open loop transfer function) ***1 point***

- encircles the -1 point once in the counterclockwise direction
- encircles the -1 point once in the clockwise direction
- encircles the origin once in the counterclockwise direction
- does not encircle the -1 point at all

No, the answer is incorrect.
Score: 0
Accepted Answers:
does not encircle the -1 point at all

7) Let G(s)H(s) be the open loop transfer function of a negative feedback closed loop system. Then, the closeness of the G(jω)H(jω) locus to the -1 point is indicative of ***1 point***

- absolute stability
- relative stability
- instability
- asymptotic stability

No, the answer is incorrect.
Score: 0
Accepted Answers:
relative stability

8) Consider a unity negative feedback closed loop system whose open loop transfer function is $\frac{s+4}{s^2+2s}$.Then, the gain crossover frequency (in rad/s) is ***1 point***

- 2
- 1.414
- 1.665
- 4

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.665

9) In problem 8), the phase crossover frequency (in rad/s) is ***0 points***

- 2
- 1.414
- 4
- ∞

No, the answer is incorrect.
Score: 0
Accepted Answers:
∞

10) In problem 8, the phase margin (in °) is ***1 point***

- 72.8
- 45
- 54.6
- 90

No, the answer is incorrect.
Score: 0
Accepted Answers:
72.8

11) In problem 8, the gain margin is ***0 points***

- 1
- 2
- 4
- ∞

No, the answer is incorrect.
Score: 0
Accepted Answers:
∞

12) The closed loop poles corresponding to the open loop transfer function given in problem 8 are ***1 point***

- -2 and -1
- 1+j and -1-j
- -1.5+1.3j and -1.5-1.3j
- -3 and -1

No, the answer is incorrect.
Score: 0
Accepted Answers:
-1.5+1.3j and -1.5-1.3j

13) Consider the closed loop sinusoidal transfer function corresponding to problem 8). The low frequency value of its magnitude (in dB) tends to **1 point**

- 0
- 6
- -6
- 10

No, the answer is incorrect.
Score: 0
Accepted Answers:
0

14) Corresponding to problem 8), the slope (in dB/decade) of the high frequency asymptote of the closed loop sinusoidal transfer function magnitude **1 point** is

- 20
- 0
- -20
- -40

No, the answer is incorrect.
Score: 0
Accepted Answers:
-20

15) Corresponding to problem 8, the cut-off frequency (in rad/s) of the closed loop sinusoidal transfer function is **1 point**

- 0.54
- 1
- 1.82
- 2.13

No, the answer is incorrect.
Score: 0
Accepted Answers:
2.13