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Unit 14 - Week 12

Assignment 12

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

1) Which ONE of the following statements is TRUE about a lead compensator? ***1 point***

- It attenuates high frequency signals and worsens the transient response
- It improves the transient response and amplifies high frequency signals
- It worsens the transient response and amplifies high frequency signals
- It improves the transient response and attenuates high frequency signals

No, the answer is incorrect.
Score: 0
Accepted Answers:
It improves the transient response and amplifies high frequency signals

2) A lead compensator introduces an open loop zero at -2 and an open loop pole at -20. Then, the corner frequencies (in rad/s) of the compensator's sinusoidal transfer function are ***1 point***

- 0.05 and 0.5
- 2 and 6.32
- 6.32 and 20
- 2 and 20

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

3) In problem 2, the maximum phase lead (in °) provided by the lead compensator is ***1 point***

- 54.9
- 41.8
- 45
- 30

No, the answer is incorrect.
Score: 0
Accepted Answers:
54.9

4) In problem 2), the frequency (in rad/s) at which the maximum phase lead would be provided is ***1 point***

- 20
- 2
- 3.16
- 6.32

No, the answer is incorrect.
Score: 0
Accepted Answers:
6.32

5) In problem 2), it is desired that the low frequency magnitude value (in dB) of the compensator's sinusoidal transfer function be 0 dB. Then, the value of the parameter K_c is ***1 point***

- 0.5
- 1
- 10
- 0.05

No, the answer is incorrect.
Score: 0

Accepted Answers:
10

Problems 6 to 11: Consider a plant whose transfer function is $\frac{1}{s(s+2)}$. It is desired that a lead compensator is used to design a unity negative feedback closed loop system with this plant.

6) If the lead compensator needs to provide a maximum phase lead of 45°, then the value of α is around **1 point**

- 0.217
- 0.172
- 0.104
- 0.071

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.172

7) If this maximum phase lead angle should be provided at a frequency of 8 rad/s, then the value of T is around **1 point**

- 0.1
- 0.3
- 0.43
- 0.8

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.3

8) It is desired that the static velocity error constant be 5 s^{-1}. Then, the value of K_c is around **1 point**

- 58.1
- 46.2
- 69.6
- 92.7

No, the answer is incorrect.
Score: 0
Accepted Answers:
58.1

9) This lead compensator introduces an open loop zero at around **1 point**

- -4
- -1.56
- -2.32
- -3.33

No, the answer is incorrect.
Score: 0
Accepted Answers:
-3.33

10) This lead compensator introduces an open loop pole at around **1 point**

- -12.45
- -19.38
- -4
- -1.26

No, the answer is incorrect.
Score: 0
Accepted Answers:
-19.38

11) Consider the transfer function of the lead compensator whose parameters have been determined in problems 6 to 10. The low frequency magnitude (in dB) of this compensator's frequency response transfer function would tend to around **1 point**

- 10
- 13
- 20
- 26

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

12) Which ONE of the following statements is FALSE about a lag compensator? **1 point**

- It attenuates high frequency components
- It increases the low frequency gain
- It reduces the steady state error
- It increases the system bandwidth

No, the answer is incorrect.
Score: 0
Accepted Answers:
It increases the system bandwidth

13) A lag compensator introduces an open loop zero at -20 and an open loop pole at -5. Then, the corner frequencies (in rad/s) of the compensator's sinusoidal transfer function are **1 point**

- 0.05 and 0.2
- 5 and 10
- 10 and 20
- 5 and 20

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

14) Consider a lag-lead compensator where T2 > T1. Then, which ONE of the following statements is TRUE about the two open loop zeros and the two open loop poles introduced by this compensator? **1 point**

- The two open loop poles would not lie between the two open loop zeros
- The two open loop poles would lie between the two open loop zeros
- The open loop pole corresponding to the lead component would lie between the two open loop zeros
- The open loop pole corresponding to the lag component would lie between the two open loop zeros

No, the answer is incorrect.
Score: 0
Accepted Answers:
The two open loop poles would not lie between the two open loop zeros

15) Considering the magnitude plot of the Bode diagram of a typical lag-lead compensator, one can conclude that **1 point**

- the high frequency components are attenuated
- the low frequency components are attenuated
- an intermediate frequency band is attenuated
- an intermediate frequency band is amplified

No, the answer is incorrect.
Score: 0
Accepted Answers:
an intermediate frequency band is attenuated