Unit 6 - Week 2: Introduction to feedback control, Nyquist stability theory

Week-2 Assessment

The due date for submitting this assignment has passed. Due on 2018-08-15, 23:59 IST.
As per our records you have not submitted this assignment.

Week-2 Assessment

1) A plant with transfer function P(s) = $\frac{(s^3+9)(s+2)}{(s+1)(s+2)(s+4)}$ is excited by sine wave of frequency 'ω'. The steady-state output of the system is zero at *0 points*

- ω = 1 rad/sec
- ω = 2 rad/sec
- ω = 3 rad/sec
- ω = 4 rad/sec

No, the answer is incorrect.
Score: 0

Accepted Answers:
ω = 3 rad/sec

2) For what value of the controller gain 'K', the time constant of the closed loop system is reduced to 10% of the time constant of open loop system. (up to 2 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 8.99,9.01

1 point

3) Identify the correct statements about feedback systems. Feedback systems are: *1 point*

1. Very sensitive to variation in sensor parameters
2. Sensitive to variation in plant parameters
3. Prone to sensor noise
4. Used to stabilize unstable plants

- 1, 2, 3
- 1, 3, 4
- 1, 2
- 2, 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
1, 3, 4

4) Find the difference between the maximum and minimum value of the steady state response of the system to the step input. (up to 3 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.001,0.003

1 po

5) For what value of the controller gain 'K' will the sinusoidal noise component of frequency 1 rad/sec be rejected by at least 90% at the output *1 point*

- $K > 1$
- K = ∞
- $K > 0.15$
- $K < 0.15$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$K < 0.15$

6) The characteristic equation of a system is given by $F(s) = 1 + G(s)H(s)$, where $G(s)H(s) = \frac{2}{(s-1)}$. For the given equation of lines: $\sigma = 0$, $\omega = 0$. in the s-plane (where $s = \sigma + j\omega$) represented in figure 1, identify the corresponding F(s)-plane plots *2 points*

No, the answer is incorrect.
Score: 0

Accepted Answers:

7) The Nyquist plot for the open loop transfer function C(s)P(s) = $\frac{\omega_n^2}{(s^2+2\zeta\omega_n s+\omega_n^2)}$ is as shown in the figure 2 (as ω varied from 0 to ∞). If the value of C(s)P(s) at $\omega = 0.5rad/s$ is $1.109\angle -33.69°$, then find the value of ζ (upto 2 decimal places).

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.49,0.51

1 point

8)

In the above problem 7, find the value of ω_n (upto 2 decimal places).

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.99,1.01

1 po

9) For a stable closed loop system, determine the total number of clock-wise encirclements in the Nyquist plot. Given the open loop transfer function $C(s)P(s) = \frac{10}{(s^2+s-2)}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) -1

1 point

Previous Page End