Irses » Control S	ystem Design Announcements Course Ask a Question Progress FAC
nit 16 - W	eek 10 :Nonminimum phase system
Course	Week 10 -Assessment
low to access ne portal	The due date for submitting this assignment has passed. Due on 2018-10-10, 23:59 IS As per our records you have not submitted this assignment.
rerequisite ssignment	1) The transfer function of a non-minimum phase system is given as $P_{NMP}(s) = \frac{1-s}{s^2+s+1}$ Identify the correct plot for the unit step response [x(t)] of the system.
IATLAB ownload and ntroduction	
IATLAB earning lodules	No, the answer is incorrect. Score: 0
Veek 1: Linear ystem Theory, ourier and aplace ransforms	Accepted Answers: ²⁾ Pade's approximation for time delay e^{-sT} is better than its Taylor's series approximation 1 provide the series approximation 1
Veek 2: htroduction to eedback control, yquist stability heory	 Pade's approximants, unlike Taylor's series approximants, yield rational functions with unity gain at all frequencies. Pade's approximants are easy to calculate when compared to Taylor's series approximants Pade's approximants are non-causal functions while Taylor's series approximants are causal
leek 3 : Bode lots, Steps for erforming ontrol design, eneral ontrollers	functions. Pade's approximants provide exactly equal phase as that provided by the time delay e^{-sT} . No, the answer is incorrect. Score: 0
leek 4: Bode- lot and root- ocus based ontrol design	Accepted Answers: Pade's approximants, unlike Taylor's series approximants, yield rational functions with unity gain a frequencies. ³⁾ Identify the bode plot of the Blaschke product $B(s) = (\frac{a-s}{s})$ from the options given ¹
Veek 5: Control systems with ome known arameters, troduction to 2- egree of eedom control	below: a + s
Week 6: 2- Degree of	

27/07/2020

design for robustness

Week 7: Quantitative feedback theory (Part 1/2)

Week 8 : Quantitative feedback theory (Part 2/2)

Lecture Notes(Week 1 -8)

Week 9: Fundamental properties of feedback systems

Week 10 :Nonminimum phase system

- Introduction to nonminimum phase systems
- Fundamental properties of nonminimum phase systems (part 1/2
- Fundamental properties of nonminimum phase systems (part 2/2)
- Quiz : Week 10
 Assessment
- Week 10: Lecture Notes
- Matlab QFT toolbox Installation

Week 11: Unstable systems

Week 12 Describing functions

Assignment solutions

Control System Design - - Unit 16 - Week 10 :Nonminimum phase system

⁴⁾ The transfer function of a minimum phase system is given as $L_{MP}(s) = \frac{1}{s^2 + s + 1}$. A ¹ point right half-plane zero at s = 1 is added to the given system. The transfer function of the resulting non-minimum phase system is given as $L_{NMP}(s) = \frac{1-s}{s^2 + s + 1}$. Find out the change in the phase margin due to the addition of the right half-plane zero.

Decreases by 10°. Decreases by 90° Increases by 15° Decreases by 15°

No, the answer is incorrect. Score: 0

Accepted Answers: Decreases by 90°

5) A certain loop gain L(s) has a RHP zero at s=43 rad/s, all other poles and zeros of the loop **1** point gain are on the left half of the s-plane. It is desired that the loop gain has a phase margin of 40°. Calculate the approximate value of the gain cross-over frequency (ω_{gc}) if the roll-off rate near ω_{gc} is $-40 \alpha dB/decade$, where, $\alpha = 0.7$.

- 8.5 rad/s
 5.3 rad/s
 2.5 rad/s
- 7.6 rad/s

No, the answer is incorrect. Score: 0

Accepted Answers: 5.3 rad/s

6) For Q5 calculate the gain-margin (GM) if the same roll-off rate of $-40 \alpha dB/decade$ exists **1** point between the gain-crossover and phase-crossover frequencies.

\bigcirc	31.11 dB
\bigcirc	11.11 dB
\bigcirc	17.3 dB
\bigcirc	15.55 dB

No, the answer is incorrect. Score: 0

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Accepted Answers: 17.3 dB
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7) If there is no constraint on the roll-off rate (α) in Q5, calculate the maximum possible value **1** point for the gain cross-over frequency ($\omega_{gc,max}$).

\bigcirc	301.2 rad/s
\bigcirc	117.5 rad/s
\bigcirc	120 rad/s
	118.1 rad/s

No, the answer is incorrect. Score: 0 Accepted Answers: 118.1 rad/s

8) In what way does a time delay e^{-sT} affect the performance of a closed loop control system? **1** point

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- Increases the phase margin.
- Reduces the gain margin.
- Increases the gain cross-over frequency
- Reduces the gain cross-over frequency.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Reduces the gain margin.

f 1 point 9) A certain loo gain L(s) with all its zeros and poles on the left half of the s-plane is cascaded with a time delay e^{-sT} , where T=25 ms. The loop gain is expected to have a phase margin of 40°. Calculate the value of gain cross-over frequency (ω_{gc}) if the roll-off rate near ω_{gc} is $-40 \alpha dB/decade$, where, $\alpha = 0.7$.

- 9.77 rad/s
- 8.65 rad/s
- 7.52 rad/s
- 7.6 rad/s

No. the answer is incorrect. Score: 0

Accepted Answers: 9.77 rad/s

10) If there is no constraint on the roll-off rate (α) in Q9, calculate the maximum possible value **1** point for the gain cross-over frequency ($\omega_{gc,max}$).

89.11 rad/s

- 111.1 rad/s
- 97.7 rad/s
- 107.7 rad/s

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

97.7 rad/s

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