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Courses » Nonlinear and Adaptive Control

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 5 - Week 4

Course outline

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Week 1

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Week 4

- Robust Model Reference Adaptive Control - Part 2
- Robust Model Reference Adaptive Control - Part 3
- Robust Model Reference Adaptive Control - Part 4
- Quiz : Assignment 4

Assignment 4

The due date for submitting this assignment has passed.
 As per our records you have not submitted this **Due on 2018-09-12, 23:59 IST.**
 assignment.

(A)

1) Consider the following dynamics

1 point

$$\begin{aligned} \dot{x}_1(t) &= -x_1^3(t) + x_1(t)x_2(t) + d_1(t) \\ \dot{x}_2(t) &= -x_1^2(t) \end{aligned}$$

Where $|d_1(t)| < \bar{d}_1$, $\bar{d}_1 > 0$. Given the following Lyapunov candidate function

$$V(x_1, x_2) = \frac{1}{2}x_1^2(t) + \frac{1}{2}x_2^2(t)$$

Which of the following is true?

- Origin is Lyapunov stable.
- Origin is asymptotically stable.
- The solution is uniformly ultimately bounded.
- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the above.

(B) State "TRUE" or "FALSE" for the following arguments

2) Knowledge of disturbance upper-bound is required in dead-zone based robust adaptive control

No, the answer is incorrect.

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No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

4) Knowledge of upper-bound of unknown parameters is required in dead-zone based robust adaptive control

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

5) Unlearning phenomenon of parameter estimates happens in dead-zone based robust adaptive control

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

6) Unlearning phenomenon of parameter estimates happens in projection based robust adaptive control

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

7) Knowledge of upper-bound of unknown parameters is required in e-mod based robust adaptive control

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

8) Knowledge of disturbance upper-bound is required in projection based robust adaptive control

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

(C) State "TRUE" or "FALSE" for the following arguments

9) The function $f(x) = e^{-x} + x^2$ is a convex function of x where $x \in \mathbb{R}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) True

1 point

10) The function $f(x) = e^{-x} - x^2$ is a convex function of x where $x \in \mathbb{R}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) False

1 point

11) The set defined as $\mathcal{S} = \{(x_1, x_2) \in \mathbb{R}^2 | x_1^2 + x_2^2 \leq 2\}$ is a convex set

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) True

1 point

12) The set defined as $\mathcal{S} = \{(x_1, x_2) \in \mathbb{R}^2 | |x_1| + |x_2| \leq 2\}$ is a convex set

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) True

1 point

(D)

13) Consider the following system

$$\dot{x}_1(t) = -x_1(t) + x_1(t)x_2(t) + d_1(t)$$

$$\dot{x}_2(t) = -x_1^2(t) - |x_1(t)|(x_2(t) - d_2)$$

Where $|d_1(t)| < \bar{d}_1$, $|d_2| < \bar{d}_2$ and $\bar{d}_1, \bar{d}_2 > 0$. Given the following Lyapunov function candidate

$$V(x_1, x_2) = \frac{1}{2}x_1^2(t) + \frac{1}{2}x_2^2(t)$$

Which of the following is true?

1 point

- Origin is Lyapunov stable.
- Origin is asymptotically stable.
- The solution is uniformly ultimately bounded.
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

The solution is uniformly ultimately bounded.

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