

Unit 5 - Week 3

Course outline

How does an NPTEL online course work?

Week 1

Week 2

Week 3

• Sensitive Dependence on Initial Conditions

• A Population Dynamics Model

• Bifurcations

○ Quiz : Assignment 3

○ Week 3 Feedback Form

Week 4

Week 5

Week 6

Week 7

Week 8

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Week 11

Week 12

Text Transcripts

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Assignment Solution

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-19, 23:59 IST.

1) Sensitive dependence on initial conditions is also called;

1 point

- Butterfly effect
 Expansive
 Lyapunov unstable
 Minimal

No, the answer is incorrect.
Score: 0

Accepted Answers:
Butterfly effect
Lyapunov unstable

2) On $[0, 1]$, the sensitivity constant of $f(x) = 2x(\text{mod } 1)$ is;

1 point

- 1/2
 1/4
 3/4
 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
1/2
1/4
3/4
1

3) For the Logistic map $f(x) = \lambda x(1 - x)$, periodic point of period 2 will be there for;

1 point

- $\lambda > -1$
 $\lambda > 2$
 $\lambda > 3$
 $\lambda < -1$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\lambda > -1$
 $\lambda > 3$
 $\lambda < -1$

4) The Lyapunov exponent of the map $f(x) = 4x^3 - 3x$ on $[-1, 1]$, $n = 6$, $x_0 = 0.1$, $e_0 = 0.01$ is;

1 point

- 0.044
 -0.044
 0.44
 -0.44

No, the answer is incorrect.
Score: 0

Accepted Answers:
-0.44

5) For the family $G_c(x) = c - x^2$, there is no fixed point for;

1 point

- $c \leq \frac{1}{4}$
 $c < -\frac{1}{4}$
 $c < -\frac{3}{14}$
 $c \geq -\frac{3}{14}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $c < -\frac{1}{4}$

6) Let $f(x) = 2x$ on $[0, 1]$, $g(x) = x^2 - \frac{3}{4}$ on $[-\frac{3}{2}, \frac{3}{2}]$, $h(x) = 3x(1 - x)$ then;

1 point

- $f(x)$ and $g(x)$ are conjugate
 $f(x)$ and $h(x)$ are conjugate
 $g(x)$ and $h(x)$ are conjugate
 None of them is conjugate to the other

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $g(x)$ and $h(x)$ are conjugate

7) Which of the following maps possesses sensitive dependence on initial conditions;

1 point

- On $[0, \frac{3}{4}]$, $f(x) = \begin{cases} \frac{3}{2}x & 0 \leq x < \frac{1}{2} \\ \frac{3}{2}(1-x) & \frac{1}{2} \leq x \leq \frac{3}{4} \end{cases}$
 On $[-1, 1]$, $h(x) = 4x^3 - 3x$
 On $[0, 1]$, $f(x) = \frac{x}{2}$
 An irrational rotation on unit circle

No, the answer is incorrect.
Score: 0

Accepted Answers:
On $[0, \frac{3}{4}]$, $f(x) = \begin{cases} \frac{3}{2}x & 0 \leq x < \frac{1}{2} \\ \frac{3}{2}(1-x) & \frac{1}{2} \leq x \leq \frac{3}{4} \end{cases}$
On $[-1, 1]$, $h(x) = 4x^3 - 3x$