

# Unit 9 - Week 7

## Course outline

How does an NPTEL online course work?

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Chaotic Properties of Mixing Systems

Weakly Mixing & Chaos

Strongly Transitive Systems

Quiz : Assignment 7

Week 7 Feedback Form

Week 8

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Text Transcripts

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Assignment Solution

## Assignment 7

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

Due on 2020-03-18, 23:59 IST.

Pick the correct options from each question. There is no negative marking.

1) Which of the following is/are true;

1 point

- Factor of a weak mixing system is weak mixing
- Factor of a mixing system need not to be mixing
- Factor of a weak mixing system need not to be weak mixing
- Every weak mixing system is mixing

No, the answer is incorrect.

Score: 0

Accepted Answers:

Factor of a weak mixing system is weak mixing

2) Which of the following is/are true;

1 point

- The irrational rotation on unit circle is weakly mixing
- The irrational rotation on unit circle is not a mixing system

The system defined by the map  $f : [0, 1] \rightarrow [0, 1]$  defined as  $f(x) = \begin{cases} 2x & 0 \leq x \leq \frac{1}{2} \\ \frac{3}{2} - x & \frac{1}{2} \leq x \leq 1 \end{cases}$  is weakly mixing

- A mixing system need not to be sensitive

No, the answer is incorrect.

Score: 0

Accepted Answers:

The irrational rotation on unit circle is not a mixing system

3) Which of the following system(s) is/are Li-Yorke Chaotic;

1 point

- The Shift System  $(\{0, 1\}^{\mathbb{N}}, \sigma)$ .
- The Tent map
- The Argument doubling map
- An irrational rotation on unit circle

No, the answer is incorrect.

Score: 0

Accepted Answers:

The Shift System  $(\{0, 1\}^{\mathbb{N}}, \sigma)$ .

The Tent map

The Argument doubling map

4) Which of the following is/are true;

1 point

- A weak mixing system may contain an isolated point
- The proximal relation is an equivalence relation
- An asymptotic pair is always proximal
- A proximal pair is always asymptotic

No, the answer is incorrect.

Score: 0

Accepted Answers:

An asymptotic pair is always proximal

5) Suppose  $(X, f)$  is a dynamical system, then;

1 point

- If  $(X, f)$  is minimal then backward orbit of every point is dense in  $X$
- If  $(X, f)$  is minimal then backward orbit of a point need not to be dense in  $X$
- If a point  $x$  has a dense backward orbit then it's forward orbit must be dense also
- If a point  $x$  with non-empty pre-image has a dense forward orbit then it's backward orbit must also be dense

No, the answer is incorrect.

Score: 0

Accepted Answers:

If  $(X, f)$  is minimal then backward orbit of every point is dense in  $X$

If a point  $x$  with non-empty pre-image has a dense forward orbit then it's backward orbit must also be dense

6) Which of the following is/are true;

1 point

- A strongly transitive system is always minimal
- A minimal system is always very strongly transitive
- A minimal system need not to be strongly transitive
- A strongly transitive system need not to be minimal

No, the answer is incorrect.

Score: 0

Accepted Answers:

A minimal system is always very strongly transitive

A strongly transitive system need not to be minimal

7) Which of the following is/are true;

1 point

- A strongly transitive invertible system is always sensitive
- A strongly transitive invertible system is always Li-Yorke chaotic
- A strongly transitive invertible system always has a dense set of periodic points
- A strongly transitive invertible system is always very strongly transitive

No, the answer is incorrect.

Score: 0

Accepted Answers:

A strongly transitive invertible system is always very strongly transitive