Unit 12 - Week 10

Assignment 10

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

Due on 2020-04-08, 23:59 IST.

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

1) Let $\mathcal{A} = \{1, 2, \ldots, k\}$ and $(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1})$ be a dynamical system. Then; *1 point*

- $h_T(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1}) = 0$
- $h_T(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1}) = \frac{1}{logk}$
- $h_T(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1}) = logk$
- $h_T(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1}) = log(\frac{1}{k})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$h_T(\mathcal{A}^{\mathbb{Z}}, \sigma^{-1}) = logk$

2) *1 point*

Let $X_{\mathcal{F}_1}$, where $\mathcal{F}_1 = \{11\}$ and $X_{\mathcal{F}_2}$, where $\mathcal{F}_2 = \{10^n1 : \text{n is odd}\}$ be the shift spaces over $\{0, 1\}$ then;

- $h_T(X_{\mathcal{F}_1}) < h_T(X_{\mathcal{F}_2})$
- $h_T(X_{\mathcal{F}_2}) \leq h_T(X_{\mathcal{F}_1})$
- $h_T(X_{\mathcal{F}_1}) = h_T(X_{\mathcal{F}_2}) = log2$
- $h_T(X_{\mathcal{F}_1}) = h_T(X_{\mathcal{F}_2}) = 0$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$h_T(X_{\mathcal{F}_2}) \leq h_T(X_{\mathcal{F}_1})$

3) Which of the following system(s) is/are true for Adler's definition of entropy; *1 point*

- An equicontinuous system always has positive entropy
- A minimal system always has positive entropy
- An equicontinuous system always has entropy 0
- A topologically transitive system always has entropy 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
An equicontinuous system always has entropy 0

4) Let (X, d_X) and (Y, d_Y) be two metric spaces and (X, f), (Y, g) be dynamical systems and $h : X \to Y$ be continuous map s.t. $hf = gh$ then; *1 point*

- $h(f) \leq h(g)$ always
- $h(f) \geq h(g)$ if h is onto
- $h(f) \leq h(g)$ if h is one-one
- $h(f) = h(g)$ always

No, the answer is incorrect.
Score: 0

Accepted Answers:
$h(f) \geq h(g)$ if h is onto
$h(f) \leq h(g)$ if h is one-one

5) Which of the following is/are true, where h_T and h are Adler's and Bowen's entropy respectively; *1 point*

- For the shift space $X_{\mathcal{F}_1}$, where $\mathcal{F}_1 = \{00\}$ over $\{0, 1\}$, $h_T(X_{\mathcal{F}_1}) < h(X_{\mathcal{F}_1})$
- For the even shift X over $\{0, 1\}$, $h_T(X) = h(X)$
- For an M-step subshift $X_{\mathcal{F}}$ of finite type, $h_T(X_{\mathcal{F}}) = h(X_{\mathcal{F}})$
- Both entropies are equal only for the full shift

No, the answer is incorrect.
Score: 0

Accepted Answers:
For the even shift X over $\{0, 1\}$, $h_T(X) = h(X)$
For an M-step subshift $X_{\mathcal{F}}$ of finite type, $h_T(X_{\mathcal{F}}) = h(X_{\mathcal{F}})$

6) Which of the following is/are true; *1 point*

- The rational rotation on unit circle has entropy 0
- The rational rotation on unit circle has positive entropy
- If a system has positive topological entropy then it will be Li-Yorke Chaotic
- If a system has positive topological entropy then it need not to be Li-Yorke Chaotic

No, the answer is incorrect.
Score: 0

Accepted Answers:
The rational rotation on unit circle has entropy 0
If a system has positive topological entropy then it will be Li-Yorke Chaotic

7) Which of the following is/are true; *1 point*

- Tent map has positive entropy according to Adler's definition
- Tent map has entropy 0 according to Bowen's definition
- Tent map is Devaney Chaotic but not Auslander-Yorke chaotic
- Tent map is both Devaney Chaotic and Auslander-Yorke chaotic

No, the answer is incorrect.
Score: 0

Accepted Answers:
Tent map has positive entropy according to Adler's definition
Tent map is both Devaney Chaotic and Auslander-Yorke chaotic