Assignment 9

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

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

1) Let \( X_1, X_2 \) be two shift spaces over the alphabets \( A_1 \) and \( A_2 \) respectively. \( X = X_1 \times X_2 \) and a sequence \((x,y)\) is defined as \(\ldots(x_1,y_1),(x_2,y_2),(x_3,y_3)\ldots\). If \( X \) is taken as a subset of \((A_1 \times A_2)^\infty\), then:
   - \( X \) is also a shift space over \( A_1 \times A_2 \)
   - \( X \) need not to be a shift space over \( A_1 \times A_2 \)
   - If \( X_1 \) and \( X_2 \) are subshifts of finite type then \( X \) is also a subshift of finite type
   - If \( X_1 \) and \( X_2 \) are subshifts of finite type then \( X \) need not to be a subshift of finite type
   - No, the answer is incorrect.

2) Subshfits of Finite Type:
   - Every subshift of finite type is open
   - Every subshift of infinite type is open
   - Factor of a subshift of finite type is open
   - No, the answer is incorrect.

3) Which of the following statements is/are true:
   - There will always be a finite collection \( F_1 \) over the alphabet \( A \) such that \( X_{F_1} = \emptyset \)
   - There need not to be a finite collection \( F_2 \) over the alphabet \( A \) such that \( X_{F_2} = \emptyset \)
   - There will never be a finite collection \( F_3 \) over the alphabet \( A \) such that \( X_{F_3} = \emptyset \)
   - For every finite collection \( F_4 \) over the alphabet \( A \), we have \( X_{F_4} = \emptyset \)
   - No, the answer is incorrect.

4) For a finite graph \( G \), the edge shift \( X_G \) is a subshift of finite type:
   - Every subshift of finite type is open
   - Every subshift of infinite type is open
   - Factor of a subshift of finite type is open
   - No, the answer is incorrect.

5) Which of the following statements is/are true:
   - A factor of a subshift of finite type is always a subshift of finite type
   - A factor of a subshift of infinite type need not to be a subshift of finite type
   - Suppose \( G \) is a graph with the adjacency matrix \( A \). Suppose there is an \( n \geq 1 \) such that \( A^n = 0 \) then \( X_G = \emptyset \)
   - No, the answer is incorrect.

6) Which of the following statements is/are true:
   - Even shift over \( (0,1) \) is open
   - Even shift over \( (0,1) \) is not open
   - Every \( M \)-step subshift of finite type need not to be written as a vertex shift
   - A vertex shift can be conjugate to a non-vertex shift
   - No, the answer is incorrect.

7) Which of the following statements is/are true:
   - The full shift over an alphabet set \{0,1,2,\ldots,1729\} has positive entropy
   - The golden mean shift has entropy 0
   - Let \( A = (0,1), F = [111] \) then entropy of \( X_F \) is 0
   - For an irreducible graph \( G \), the entropy of \( X_G \) is always 0
   - No, the answer is incorrect.

8) Assignment Solution:
   - All eigen values of \( A \) will be 0
   - There will always be a positive eigen value
   - There is an eigen value which is greater in magnitude than all other eigen values
   - Name of the above is true
   - No, the answer is incorrect.

9) Assignment Solution:
   - There will always be a positive eigen value
   - There is an eigen value which is greater in magnitude than all other eigen values

Due on 2020-04-01, 23:59 IST.