

9. Homework

Due **Wednesday 11/24/04** before class

1. Linearity of Expectation

Let Ω be a sample space with a probability function $P : \Omega \rightarrow [0, 1]$.

- (i) (5 points) Show that for any two random variables X_1, X_2 on Ω , the following *linearity of expectation* holds:

$$E(X_1 + X_2) = E(X_1) + E(X_2)$$

- (ii) (5 points) Show by induction on n , that for any n random variables X_1, \dots, X_n on Ω , for any $n \geq 2$, the following holds:

$$E\left(\sum_{i=1}^n X_i\right) = \sum_{i=1}^n E(X_i)$$

2. 7.5 (page 513)

- (4 points) 2a,d. Justify your answers.

3. 8.2 (page 555)

- (1 point) Determine the degree of every vertex in the graph of example 3, and verify that the handshake lemma holds.
- (1 point) Determine the in-degree and the out-degree of every vertex in the graph of example 9, and verify that the handshake lemma holds.
- (2 points) 18 a,b,c,d
- (2 points) 24 a,b PROBLEM CANCELLED FROM HOMEWORK
- (2 points) 26

5. 8.3 (page 563)

- (1 point) Represent the graph of exercise 2 with an adjacency matrix.
- (1 point) Represent the graph of exercise 2 with adjacency lists.
- (1 point) Represent the graph of exercise 4 with an adjacency matrix.
- (1 point) Represent the graph of exercise 4 with adjacency lists.
- (1 point) 12
- (1 points) 30 PROBLEM CANCELLED FROM HOMEWORK
- (1 point) 34 PROBLEM CANCELLED FROM HOMEWORK
- (1 point) 36 PROBLEM CANCELLED FROM HOMEWORK