

Extra problem 1: Suppose that A , B and C are independent events. This means that

$$P(A \cap B) = P(A)P(B), \quad P(B \cap C) = P(B)P(C), \quad P(A \cap C) = P(A)P(C)$$

and

$$P(A \cap B \cap C) = P(A)P(B)P(C).$$

Prove that it follows from this that

$$P(A \cap B \cap C^c) = P(A)P(B)P(C^c),$$

where C^c is the complement of C .

Extra problem 2: A man and his wife are both carriers of Tay-Sachs disease. Suppose they have four children and each child has a probability of .25 of inheriting the disease, independent of whether the other children inherit it or not. Let Z denote the number of children in the family who inherit the disease. Find the probability mass function for Z . Find the distribution function for Z . Draw a graph of the probability mass function and the distribution function for Z . What is the expected value of Z ?

Homework problems from Durrett: page 29-30, problems 35, 38, 40, 44, 48, 49.