

1 Rain and Wind

The local weather channel just released a statistic for the months of November and December. It said that the probability that it would rain on a windy day is 0.3 and the probability that it would rain on a non-windy day is 0.8. The probability of a day being windy is 0.2. As a student in EECS 70, you are curious to play around with these numbers. Find the probability that:

- (a) A given day is both windy and rainy.

- (b) A given day is rainy.

- (c) For a given pair of days, exactly one of the two days is rainy. (You may assume that the weather on the first day does not affect the weather on the second.)

2 Lie Detector

A lie detector is known to be $\frac{4}{5}$ reliable when the person is guilty and $\frac{9}{10}$ reliable when the person is innocent. If a suspect is chosen from a group of suspects of which only $\frac{1}{100}$ have ever committed a crime, and the test indicates that the person is guilty, what is the probability that he is innocent?

3 Bag of Coins

Your friend Forest has a bag of n coins. You know that k are biased with probability p (i.e. these coins have probability p of being heads). Let F be the event that Forest picks a fair coin, and let B be the event that Forest picks a biased coin. Forest draws three coins from the bag, but he does not know which are biased and which are fair.

- (a) What is the probability of three coins being pulled in the order FFB ?

- (b) What is the probability that the third coin he draws is biased?

- (c) What is the probability of picking at least two fair coins?

- (d) Given that Forest flips the second coin and sees heads, what is the probability that this coin is biased?