

Mathematics 375 – Probability and Statistics 1
Discussion 2 – The “Event-Composition Method”
September 16, 2005

Background

We have discussed the “event-composition” method for computing probabilities in a discrete sample space. Recall that the idea is to recognize that the event of interest E can be defined using some combination of unions, intersections, or complements of other known events. Then apply the additive and multiplicative laws of probability:

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

and

$$P(A \cap B) = P(A)P(B|A) = P(B)P(A|B)$$

to find $P(E)$ from the other given information.

Discussion Questions

A) Given: $P(A) = .2$, $P(B) = .3$, $P(A \cup B) = .4$. Determine:

- 1) $P(\overline{A} \cup \overline{B})$.
- 2) $P(\overline{A}|B)$.

B) The circles marked 1,2,3,4 in the following diagrams represent electrical relays that operate independently and function properly with probability $p = .85$.

Which design yields the higher probability that current will flow when the relays are activated?

C) An accident victim will die unless he receives type $A+$ blood before 10 minutes elapse. He will be saved if he does get the blood transfusion. Potential donors and a reusable blood typing kit are available, but it takes 2 minutes to determine each donor’s blood type, and only 40% of them have type $A+$ blood. What is the probability that the victim will be saved if only one donor’s blood can be typed at a time?

Assignment

Group writeups due Wednesday, September 21.