IMM - DTU

02405 Probability
2005-5-30
BFN/bfn

Solution for exercise 2.1.6 in Pitman

We define events Bi that the man hits the bull's eye exactly i times. The probabilities of the events Bi is given by the Binomial distribution

$$P(Bi) = \left(\begin{array}{c} 8 \\ i \end{array} \right) 0.7^i 0.3^{8-i}$$

Question a) The probability of the event

$$P(B4) = \frac{8 \cdot 7 \cdot 6 \cdot 5}{4 \cdot 3 \cdot 2 \cdot 1} 0.7^4 0.3^4 = 0.1361$$

Question b)

$$P(B4 | \cup_{i=2}^{8} B_i) = \frac{P\left((B4 \cap (\cup_{i=2}^{8} B_i)\right)}{P\left(\cup_{i=2}^{8} B_i\right)} = \frac{P(B4)}{1 - P(B0) - P(B1)} == 0.1363$$

Question c)

$$\left(\begin{array}{c} 6 \\ 2 \end{array} \right) 0.7^2 0.3^4 = 0.0595$$