



AMERICAN UNIVERSITY OF BEIRUT
STATISTICS 238, Final Exam

Jan 24, 2005

Time = 1 Hour and 30 Minutes

You are allowed to use a formula sheet.

1. Some numbers are selected at random from a table of random numbers containing integers 1 to m inclusive. The system is said to be in state j if the largest integer selected number is j , for $j=1, \dots, m$. Compute P_{ij}^n .
2. My house uses two light bulbs. On the average, a light bulb lasts 22 days (exponentially distributed). When a light bulb burns out, it takes me on the average of 2 days (exponentially distributed) before I replace it. What is the average number of working light bulbs?
3. The Birth and Death process with $\lambda_j = 0$ for $j \geq 0$ and $\mu_j = \mu$ for $j > 0$ is called a pure death process. Find $P_{ij}(t)$.
4. The Birth and Death process with $\lambda_j = j\lambda$ for $j \geq 0$ and $\mu_j = 0$ for $j \geq 0$ is called a linear birth process. Find $P_{ij}(t)$.