

CSE 312: Foundations of Computing II

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Lecture Topics: 5.5 Convolution

[Tags: Convolution]

1. We'll practice some discrete convolutions.
 - a. Let $X \sim \text{Ber}(p)$ and $Y \sim \text{Ber}(q)$ be independent, and $Z = X + Y$. Find Ω_Z and $p_Z(z)$.
 - b. Let $X \sim \text{Bin}(n, p)$ and $Y \sim \text{NegBin}(r, p)$, and $Z = X + Y$. Let $n = 3, r = 5$. Find Ω_Z and $p_Z(z)$.

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2. Mitchell and Alex are competing together in a 2-mile relay race. The time Mitchell takes to finish his mile (in hours) is $X \sim \text{Exp}(\lambda = 2)$ and the time Alex takes to finish his mile (in hours) is continuous $Y \sim \text{Unif}(0,1)$. Alex starts immediately after Mitchell finishes his mile, and their performances are independent. What is the distribution of the total time taken to complete this race?