Example - Joint distribution

Let $X \sim Bin(3, 0.5)$. For each value of X consider $Y \sim Bernoulli(\frac{1}{X+2})$.

a) Calculate $P(X = 3|Y = 1)$

b) Calculate $E[Y|X = 2]$

c) Calculate $P(Y > X)$

Example

A bin of 5 transistors is known to contain 2 that are defective. The transistors are to be tested, one at a time, until the defective ones are identified. Denote by N_1 the number of tests made until the first defective is spotted and by N_2 the number of additional tests until the second defective is spotted.

Find the joint probability mass funtion of N_1 and N_2.

Example

If X and Y are independent Poisson random variables with respective parameters λ_1 and λ_2 calculate the conditional distribution of X given that $X + Y = n$.