Homework # 6

Due 3/12

1. Reading: Sections 3.1, 6.1 − 6.3. (In 6.1 − 6.3, the authors introduce independence, which we will discuss next week.)

2. Exercises $3.8, 6.14, 6.25, 6.26$

3. Chapter 6, Problems 8 (the Cauchy distribution is defined in section 5.4), 9

4. Let X, Y be Bernoulli rv's, but instead of having the usual outcomes of 0 and 1, let the possible outcomes of each of the rv be either -1 or 1. Define the joint pmf as follows,

$$p(x, y) = \alpha \exp[-\lambda xy], \tag{1}$$

where α is chosen so that the pmf sums to 1 (α is referred to as a normalizing factor). Different values of the parameter λ give different pmf. Construct the pmf table for the three pmfs defined by $\lambda = -1$, $\lambda = 0$, and $\lambda = 1$. What happens to the pmf as $\lambda \to \infty$ and $\lambda \to -\infty$? (This is a parameteric model, the parameter being λ, of the joint distribution of two Bernoulli r.v. It can be generalized to any number of Bernoulli r.v., for example $p(x, y, z) = \alpha \exp[-\lambda_1 xy - \lambda_2 xz - \lambda_3 yz]$.)