Econ 241A Probability, Statistics and Econometrics
Fall 2017

Problem Set 2

1. Consider these three events:

   (a) $A = \{X = 2\}$
   (b) $B = \{X = 4\}$
   (c) $C = \{X = 5\}$

   Consider also these two discrete probability distributions:

   (a) Binomial with parameters $n = 6$, $p = 0.4$
   (b) Poisson with parameter $\lambda = 2$

   For each distribution calculate the probability of each event.

2. Consider these three events:

   (a) $A = \{-2 \leq X \leq 2\}$
   (b) $B = \{0 \leq X \leq 3\}$
   (c) $C = \{1 < X < 6\}$

   For each of the following distributions calculate the probability of each event:

   (a) Exponential with parameter $\lambda = 3$
   (b) Standard normal
   (c) Standard logistic ($\mu = 0, \sigma = 1$)

3. Suppose X has the exponential distribution with parameter $\lambda = 2$. Let $Z = \exp(X)$. Find $\mathbb{E}(Z)$, $\mathbb{E}(Z^2)$ and $\text{Var}(Z)$.

4. A random variable X has a Weibull (extreme value) distribution if

$$F_X(x|\alpha) = e^{-e^{-(x+\alpha)}}$$

   What is the cdf of $X - \nu$, where $\nu \in \mathbb{R}$ is a constant?

In addition, solve the following problems from Casella and Berger: 2.1 (b), 2.23, 2.17 and 3.4.