Lsn19

Clark

Admin

Review. We started with defining Random Variables as mappings from a Sample space to the Real line and last class we discussed special functions of our random variables that we call *Statistics*. In some cases we are able to find out the exact distribution of our Statistic. For instance, let $Y_1, \cdots, Y_n$ be iid samples from a Poisson distribution with parameter λ and say our statistic is $T = \sum_{i=1}^n Y_i$. What is the sampling distribution for T?

However, is this really a useful statistic if we want to make inference for λ? In general, we want our statistics to give us information about some parameter of interest and one statistic that is often helpful is $\bar{Y} = n^{-1} \sum_{i=1}^n Y_i$. However, knowing the sampling distribution of $\bar{Y}$ may not be entirely obvious. Let's try to do it for Poisson.

While the exact sampling distribution may be unknown, as it turns out the *limiting distribution* for $\bar{Y}$ may be known due to the Central Limit Theorem (CLT).

Let's look at it on pg. 376.

What is this saying?

If we have $E[Y_i] = \mu$ and $Var[Y_i] = \sigma^2$ what is the distribution for $\bar{Y}$?

Let's go back to our Poisson. What is the distribution for $\bar{Y}$ as n gets sufficiently big?

Can we use this to make inference for λ? What happens to our Variance as our Mean increases?

Proof of CLT:

Review