Christopher Ward

Probability and Applied Statistics

Formula Sheet

The ***mean*** of a sample:

The ***variance*** of a sample:

The ***standard deviation*** of a sample:

The ***permutation*** of a sample:

The ***combination*** of a sample:

The ***conditional probability*** of an event A, given that even B occurred:

Two events A and B are said to be ***independent*** if any one of the following holds:

**The Multiplicative Law of Probability**

The probability of the ***intersection*** of two events A and B is:

If A and B are ***independent***, then:

**The Additive Law of Probability**

The probability of the ***union*** of two events A and B is:

If A and B are mutually exclusive events,

and

***Bayes’ Rule*** If {B­1, B2, …, Bk} is a partition of S such that P(Bi) > 0, for i = 1, 2, …, k. Then,

A random variable Y is said to have a ***binomial distribution*** based on ***n*** trials with success probability ***p*** if and only if:

,

A random variable Y is said to have a ***geometric distribution*** if and only if:

,

If Y is a random variable with a ***geometric distribution***,

, and

A random variable Y is said to have a ***hypergeometric probability distribution*** if and only if:

, where y is an integer 0,1, 2,…,n, subject to the restrictions

If Y is a random variable with a ***hypergeometric distribution***,

, and

A random variable Y is said to have a ***negative binomial probability distribution*** if and only if:

,

If Y is a random variable with a ***negative binomial distribution***

A random variable Y is said to have a ***Poisson Probability Distribution*** if and only if:

, With p(y) = 0 for other values of y, and e = 2.7182818

Tchebysheff’s Theorem: