Some Useful Matlab Functions

Here is a list of some Matlab functions that we used for probability and percentile computations:

- $binopdf(x, n, p)$: for computing $P(X = x)$, the pmf of $X \sim Bin(n, p)$

- $binocdf(x, n, p)$: for computing $P(X \leq x)$, the cdf of $X \sim Bin(n, p)$

- $poisspdf(x, \lambda)$: for computing $P(X = x)$, the pmf of $X \sim Poisson(\lambda)$

- $poisscdf(x, \lambda)$: for computing $P(X \leq x)$, the cdf of $X \sim Poisson(\lambda)$

- $hygepdf(x, N, R, n)$: for computing $P(X = x)$, the pmf of $X \sim HG(N, R, n)$

- $hygecdf(x, N, R, n)$: for computing $P(X \leq x)$, the cdf of $X \sim HG(N, R, n)$

- $geopdf(x, p)$: for computing $P(X = x)$, the pmf of $X \sim Geom(p)$ where X counts number of failures before the first success (rather than the total number of trials)

- $geocdf(x, p)$: for computing $P(X \leq x)$, the pmf of $X \sim Geom(p)$ where X is as above

- $expcdf(x, \mu)$: for computing $P(X \leq x)$, the cdf of $X \sim Exp(\lambda)$ where $\mu = 1/\lambda$

- $normcdf(x, \mu, \sigma)$: for computing $P(X \leq x)$, the cdf of $X \sim N(\mu, \sigma^2)$

- $norminv(p, \mu, \sigma)$: for computing p-quantile (or $100 \times p$ th percentile) of $X \sim N(\mu, \sigma^2)$:

  for example, $norminv(0.90, 0, 1)$ gives 1.2816 which is the 90th percentile z-score.

- $logncdf(x, \mu, \sigma)$: for computing $P(X \leq x)$, the cdf of $X \sim \log N(\mu, \sigma^2)$

  - Some other commonly used functions are "mean", "median" and "std" which apply to a vector of sample observations.

  - For graphs, we can use functions like "histogram", "hist", "boxplot", "plot".

  - For checking visual normality, "qqplot" function can be used. Another useful function for normality is "kstest" but it only applies to standardized variables (with z-scores).

  - We can also generate random numbers from major distributions using suitable Matlab functions. For example, "rand" function is used to generate random numbers from Unif(0,1) distribution and "normrnd" is used to simulate numbers from a normal distribution (by also specifying the model parameters and the size of the random vectors/matrices.

  For more information about their syntax or additional options, you can use the help function on command window. For example, "help normcdf" command provides additional information or examples about normcdf function.