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Proj#3 Confidence Intervals

Goal:

The goal of this assignment was to gain experience with the intuition behind confidence interval through reduction to practice. It was accomplished by testing the proportion of confidence intervals that cover the ground truth parameter to coincide with the probability associated with the confidence interval.

In begining this project, I had to read the baron text, review lectures 13 & 14, re-read the zybooks section on zScores, and do various research to grasp and understanding of what is actually happening. It is my understanding that by calculating z-scores for a population sample mean and sample variance (in this case MLE) of a normal distribution can present us with the percentage that the mean or variance of the sample will fall withing a given confidence interval. This interval is found by taking the sample mean or variance + or – the z score multiplied by the standard error. I demonstrated how I found the percentage for the interval and then search for the correct z score from the table here : <http://www.stat.ufl.edu/~athienit/Tables/Ztable.pdf> (also included in the project folder). Once I had the correct zscores I then used the score for each percent to calculate the ground truth intervals from the overall 400 trial muHat and sigmaSqHat. I was then able to go through each sample to calculate how often the sample mean actually feel within the base confidence interval. Once I had these calculations I then presented them by print them out to the log, and by 2 line plots. It is clear to see in each plot how the tested samples follow very closely to each of the ground truth parameters. Every time I run the experiment, the percentages are very close what is expected. I believe I have an understanding of confidence intervals, but I am not 100% sure about how to compare them. I was stuck at whether or not to calculate a new CI for each sample and compare that to the original, or to test how many sample means/variance fell within the expected original Confidence intervals. I suspect I may have chose the wrong way but have run out of time. Either way, this was a very great project that forced me to learn more than was expected. I enjoyed it but hope to grasp a strong future understanding on which is best to compare these results.

