

GB704 - Homework 1
Due : Wednesday, September 21st

Problem 1 (20pts)

A company claims that a plastic injection press is properly calibrated, which they define to mean that the rejection rate is 1% or less. You plan to use a preliminary run of length 500 to test that claim.

1. Under the hypothesis that the rejection rate is 1% and assuming the CLT applies approximately what is a good approximation of the standard deviation of the test-run rejection rate?
2. The run produces 9 rejects. Would you reject the hypothesis that the machine rejection rate is 1%? Explain.
3. Your manager is concerned that the run is too short for comfort. She wants you to select the run size so that – under the null and assuming the CLT applies – the standard error of the mean rejection rate is 0.1%. How large must the run be to meet that requirement?

Problem 2 (30 pts)

Find a publicly traded stock for which at least 10 years of historical data exist. Throughout this problem, use data at a **monthly frequency**, which will give you 12 observations per year and will make computations easier.

1. Plot the stock's monthly close price (adjusted for dividends and splits) against the S&P500 index since January 1, 2005. Find a way to plot both series on the same chart so that they can be easily compared.
2. Regress your company's monthly return on the S&P500's return
3. If I tell you that the S&P500 is going to return 5% this coming month and based on the model you just estimated, what would be your forecast for your stock's return over that same period?