Present your results as in homework 1.

1. Using the given SST matrix ‘data(K, L)’ with number of rows K=804 and number of columns L=10:

YR MON NINO1+2 ANOM NINO3 ANOM NINO4 ANOM NINO3.4 ANOM

* 1. Compute the sample mean, sample variance, and sample standard deviation for Nino3 SST (column 5 in data matrix) using the matlab built in functions ‘mean’, ‘var’, and ‘std’, respectively (for their definitions see section 3.2 in the book by Thomson and Emery, Data Analysis Methods in Physical Oceanography, 3rd ed., which is available in our class website).

Compute the square root of the variance and verify that it equals the output of the function std.

* 1. Compute the 95% confidence interval of the sample mean for Nino3 assuming that SST observations are normally distributed using Eq. 3.38.

mean-(zalpha/2\*std)/sqrt(N) < mean < mean+(zalpha/2\*std)/sqrt(N)

where N, mean, and std are sample size, sample mean, and sample standard deviation, respectively and zalpha/2 can be calculated from Table A4.1 in Appendix D.

* 1. Is the sample mean SST for Nino3 significantly different than 25.5 at the 95% level?
  2. Compute the 95% confidence interval of the sample variance of Nino3 SST (vn) using the matlab function chi2inv and knowing that:

Minvar< vn < Maxvar

nu=N-1

Minvar=(nu\*vn)/chi2inv(1-alpha/2,nu), Maxvar=(nu\*vn)/chi2inv(alpha/2,nu)

1. In time series analysis it is almost always assumed that the time series are normally distributed in order to estimate error bars on sample statistics as in 1.b and 1.d above.
   1. Use the matlab function histfit applied to Nino3 SST to compare a histogram with a normal distribution fit to the histogram.
   2. Using the matlab function normfit applied to Nino3 SST compute the 95% confidence interval for mean. Compare your results to problem 1.b.
   3. Using the matlab function normfit applied to Nino3 SST compute the 95% confidence interval for the standard deviation. Compare your results to the square root of the results for problem 1.d.
2. Repeat 2.b for Nino3.4. Are the mean and standard deviations of Nino3.4 different from those of Nino3 at the 95% confidence level?
3. Repeat 2.b for Nino1.2. Are the mean and standard deviations of Nino1.2 respectively different from 23.1 and 2.1 at the 95% confidence level?
4. Using the matlab function normfit applied to Nino3 SST compute the 90% confidence intervals of:
   1. The sample mean.
   2. The sample standard deviation.