

Quantifying uncertainty and correlation in complex systems

An incomplete list of Matlab commands

This is a list of Matlab commands used in this module. Detailed input/output/options and examples of each command can be found in Matlab help file or MathWorks website. Some basic tips:

- (1) : Always first go for help files for help. You can use standard math language as searching key words, e.g. Gaussian distribution, Fourier transform, correlation function.
- (2) : Most challenges you meet have been posted (and possibly solved) on the Internet. Use Google to find questions like 'how to change location/color/font of legends in matlab'.
- (3) : Some commands need Matlab toolboxes. Current Matlab licence bought by university only allows students to install restricted toolboxes on home computers. But you can always use the full toolboxes on a warwick computer, including godzilla. PhD students should have access to the full licence.

Basics

- `rng()` : set random number seed.
- `mean()` : mean of data.
- `std()` : standard deviation of data.
- `var()` : variance of data.
- `normrnd()`, `exprnd()`, `gprnd()` ... : generate random numbers.
- `normcdf()`, `expcdf()`, `gpcdf()` ... : CDF function.
- `normpdf()`, `exppdf()`, `gppdf()` ... : PDF function.
- `normfit()`, `expfit()`, `gpfit()` ... : Fit data.
- `load` : load data from a file.
- `xlsread` : load data from Excel files.
- One can use build-in app 'Import Data' to generate scripts.
- `dlmwrite` : write matrix to ASCII-delimited file.
- `vpasolve` : numerically solve an equation.
- `length()` : length of an array.
- `max/min` : max/min element of an array.
- `abs` : absolute value.

Statistics

- `hist` : histogram.
- `boxplot` : box plot.
- `qqplot`: QQ plot.
- `ecdf(x)` : empirical CDF from data x .
- `ksdensity(x)` : kernel density estimate.
- `cov(x)` : covariance of data.
- `autocorr` : autocorrelation function. (toolbox required)
- `xcor` : cross correlation function.

Time Series Analysis

- `p=polyfit(x, y, M)` : fit data to order M polynomials, return parameter.
- `polyval(p, x)` : compute polynomials with parameter p at points x .
- `arima` : ARIMA class process. (toolbox required)
- `estimate` : estimate ARIMA model parameters. (toolbox required)
- `interp1` : 1-D data interpolation.
- `periodogram` : periodogram power spectral density estimate.
- `pcov` : autoregressive power spectral density estimate.
- `fft` : fast Fourier transform.

Plot Figures

- `subplot` : multi plots in one pic.
- `title` : title. (not necessary. better write titles with Latex)
- `xlabel, ylabel` : labels.
- `xlim, ylim` : display window size.
- `hold on/off` : multiple plots in one figure.
- `grid on` : set grid on.
- `figure` : open a new figure (to plot).
- `legend` : legend.
- `set(gca, 'xscale', 'log', 'yscale', 'log')` : double log axis.