

# Matlab Stat Software Library

**Here is some software you can play with in MatLab.**

If you shift-click, it should be like an ftp and you can store the file on your local computer, in the directory where you will run Matlab. If you just click on the link, it will display the program in your browser.

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**Illustration of Column Space:** A program to make a data set in three-space of two orthogonal vectors and SVD it.

[vects.m](#)

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**Autocorrelation Function:** A program to calculate autocorrelation.

[auto.m](#)

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**Two-Dimensional Eigenvector Illustration:** A program to make a two dimensional data set, do EOF analysis, and plot a scatter diagram of the data and the corresponding EOFs.

[twodim.m](#)

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**EOF Analysis of Red Noise:** Sample red noise with a specified spatial autocorrelation from a limited spatial domain. Look at how the eigenvectors depend on the size of the domain and the spatial autocorrelation. Note that, when the domain of state space is small compared to the autocorrelation distance, you can get seemingly significant EOFs that look like a Fourier series, but they are rubbish. Play with the parameters.

[eofrn.m](#)

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**Scaling of Eigenvectors:** A program to make a two dimensional data set, do EOF analysis, and scale the EOFs. It includes options for normalizing the data or not prior to analysis. You can also vary the

amplitude of the noise.

[eof.m](#)

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**Rotation of Eigenvectors:** ROTRED generates a data set consisting of red noise in space plus Gaussian shapes located at points 8, 20, and 29 on the x axis. These vary with time with periods of 20, 25, and 24 days, respectively. If you run this with the recommended parameters, it will give you somewhat sinusoidal eigenvectors, but the rotated ones will look like the isolated Gaussian shapes that were put in. The recommended parameters are given as the first number in parentheses, when the input is requested. Use these the first time, then play with the parameters. The rotation does not work well if the data set is just noise. You need to place the EOF rotation software, `varimax.m`, in the directory, too.

[rotred.m](#)

You need to put these files in the directory, too. They are the rotation software function and something to allow default values to be specified.

[varimax.m](#) . . [inputwd.m](#)

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**Sampling of Red Noise Spectra:** RRSPEC generates red noise data and computes and plots spectra with sample sizes ranging from one to a large number at intervals that you specify. The first time through just press the return key repeatedly and watch the spectrum evolve. The idea is to watch the noise decrease and the 99% significance level come down as the sample size and degrees of freedom are increased. The spectrum is normalized to the same variance as the red noise hypothesis (backwards) and the 99% significance level is plotted, too. After the first time through you can change any of the input parameters to see how things change. You need two additional programs `fstat.m` and `inputwd.m` to make this work. It uses a Hamming window.

[rrspec.m](#)

You need to put these files in the directory, too. They are a crude F-Statistic program and one to allow default values to be specified on keyboard input.

[fstat.m](#) . . [inputwd.m](#)

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