Tutorials and worked examples for simulation, curve fitting, statistical analysis, and plotting.
http://www.simfit.org.uk

The QR factorization of a matrix is a widely used technique in data analysis, for instance when solving linear least squares problems.

From the main SIMFIT menu choose [Statistics], then [Numerical analysis], and select the option to calculate the QR decomposition of a matrix, noting that the following arbitrary 7 by 5 matrix A is contained in the default test file `matrix.tf2`.

Matrix A

1.20	3.60	1.90	8.50	3.20
4.70	8.85	9.91	2.50	8.06
6.34	8.12	5.56	3.45	7.76
3.65	7.78	3.48	1.15	6.67
3.32	8.83	4.46	7.82	4.49
3.61	7.82	1.08	5.22	6.38
6.12	5.51	8.03	5.61	4.43

Proceeding to the analysis of this matrix yields the following results.

QR factorization of matrix A

The orthogonal matrix Q_1

-1.0194525E-01	-2.5040780E-01	7.4979981E-02	7.3028426E-01	5.5733913E-01
-3.9928558E-01	-2.1648714E-01	7.2954175E-01	-2.9595704E-01	2.7393825E-01
-5.3861076E-01	2.6379623E-01	-3.2944854E-01	-1.4891526E-01	1.8269264E-01
-3.1008348E-01	-3.0017948E-01	-1.5219943E-01	-4.2044142E-01	6.5037721E-02
-2.8204853E-01	-5.2829344E-01	7.5783253E-02	2.7828157E-01	-6.9912752E-01
-3.0668530E-01	-3.1512480E-01	-5.5196151E-01	3.2818257E-02	1.4906187E-01
-5.1992079E-01	5.9357854E-01	1.4156702E-01	3.1879447E-01	-2.5637022E-01

The lower triangular/trapezoidal matrix R

-1.1771024E+01	-1.8440180E+01	-1.3988503E+01	-1.0802824E+01	-1.5318642E+01
	-6.8692395E+00	-1.2916776E-01	-4.5510241E+00	-4.2543105E+00
		5.8894908E+00	-3.4486568E-01	-5.7542482E-03
			8.6061685E+00	-1.1373065E+00
				2.5191361E+00

Note that the factorizing of a m by n matrix depends upon m and n as in

$$\begin{aligned} A &= QR \text{ when } m = n \\ &= Q_1 Q_2 \begin{pmatrix} R \\ 0 \end{pmatrix} \text{ when } m > n \\ &= Q(R_1 R_2) \text{ when } m < n, \end{aligned}$$

where Q is a m by m orthogonal matrix and R is either upper triangular or upper trapezoidal.
When $m \geq n$ then $A = Q_1 R$ and R is upper triangular.
When $m < n$ then R_1 is upper triangular and R_2 is rectangular.

You can display or write to file the matrices Q, Q_1, R, or R_1.