Symmetric eigenvalue problems of the form $Ax = \lambda Bx$ can be solved uniquely if A and B are symmetric and B is positive definite, as long as appropriate scaling conventions are understood.

From the SIMFIT main menu choose [Statistics] then [Numerical analysis] and open the procedure to solve symmetric eigenvalue problems. From this control you are given the options to solve any of the following three problems.

$$Ax = \lambda Bx$$
$$ABx = \lambda x$$
$$BAx = \lambda x$$

The SIMFIT default test files are `matrix.tf4` containing matrix A, and `matrix.tf3` containing matrix B as now displayed.

Matrix A

0.24	0.39	0.42	-0.16
0.39	-0.11	0.79	0.63
0.42	0.79	-0.25	0.48
-0.16	0.63	0.48	-0.03

Matrix B

4.16	-3.12	0.56	-0.10
-3.12	5.03	-0.83	1.09
0.56	-0.83	0.76	0.34
-0.10	1.09	0.34	1.18

The results from analyzing the standard problem $Ax = \lambda Bx$ are then as follows.

Eigenvalues...Case: $Ax = \lambda Bx$

-2.2254476E+00
-4.5475588E-01
1.0007648E-01
1.1270387E+00

Eigenvectors by column ...Case: $Ax = \lambda Bx$

-6.9005765E-02	3.0795498E-01	-4.4694499E-01	-5.5278790E-01
-5.7401486E-01	5.3285741E-01	-3.7084023E-02	-6.7660179E-01
-1.5427579E+00	-3.4964452E-01	5.0476980E-02	-9.2759211E-01
1.4004070E+00	-6.2110938E-01	4.7425180E-01	2.5095480E-01

It should be noted that the eigenvectors are the columns of a matrix X that is normalized so that

$$X^T BX = I, \text{ for } Ax = \lambda Bx, \text{ and } ABx = \lambda x,$$
$$X^T B^{-1} X = I, \text{ for } BAx = \lambda x.$$

where I is the identity matrix.

Warnings will be issued if there is a clash of dimensions, or A and B are not symmetric, or B is not positive definite.