Using computer programs to calculate eigenvalues and eigenvectors of a matrix

Excel

To calculate eigenvalues in eigenvalues and eigenvectors in excel you can download the add-in 'matrix.xla' that can be found at

http://digilander.libero.it/foxes/SoftwareDownload.htm

(you can click the address to open it in a new window) and use the function 'MEigenvalQR' to calculate eigenvalues and 'MEigenvec' to calculate eigenvectors. For more details on how to use the functions, see the reference guide that can be found at Tutorial of Numerical Analysis with Matrix.xla.

MATLAB / GNU Octave

If you have a matrix

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{bmatrix}$$

Then you can store this matrix in matlab by writing

```
A = [a11,a12,...,a1n
     a21,a22,...,a2n
           ...
     an1,an2,...,ann]
```

On the command-line.

Then use the `eig` function.

```
[eigenVectors,eigenValues] = eig(A)
```

This will give you the eigenvectors and eigenvalues on the following form.

$$\text{eigenVectors} = \begin{bmatrix} v_1 & v_2 & \dots & v_n \end{bmatrix}$$

$$\text{eigenValues} = \begin{bmatrix} \lambda_1 & 0 & \dots & 0 \\ 0 & \lambda_2 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & \lambda_n \end{bmatrix}$$

Where v_i is an eigenvector written as a column vector and λ_i is the corresponding eigenvalue.

Maple

For Maple there is a very good example at their help page for the eigenvectors function: If you're uncertain it should be possible to copy their code exactly for the first example on the page, exchanging the matrix with your own. Calculating eigenvalues and eigenvectors using Maple.