# Diagonalization

Consider the following 2 by 2 matrix:

$$A = \begin{pmatrix} 1 & 6 \\ 5 & 2 \end{pmatrix}$$

The linear transformation associated to this matrix has a simple description as follows:
If we take the ordered basis of coordinate $2-$ space given by the vectors

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} \begin{pmatrix} 6 \\ -5 \end{pmatrix}$$

then left multiplication by the matrix sends the first basis vector into 7 times itself, and it sends the second basis vector into -4 times itself.
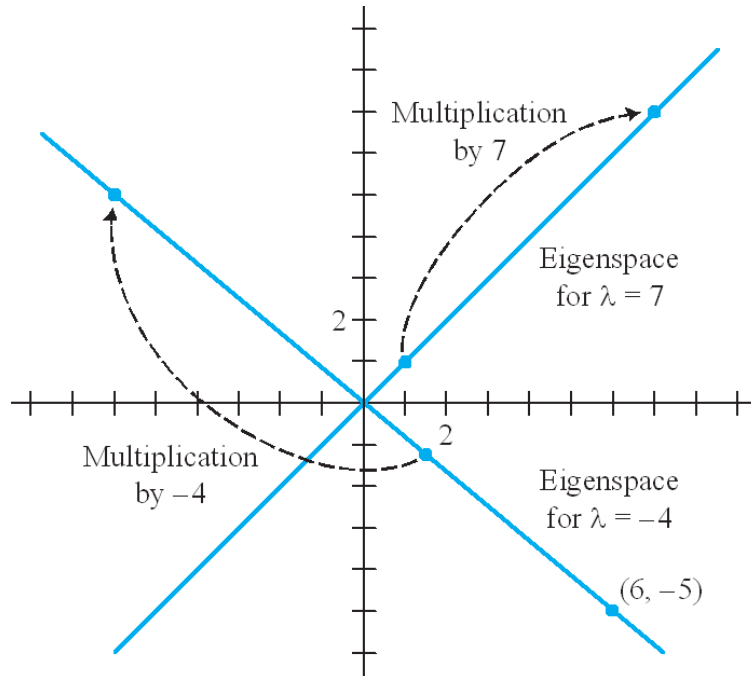
Note that the eigenvectors are not perpendicular and the matrix is not symmetric for this example.