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eigenvector

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| Related topic | SingularValueDecomposition |
| Related topic | Eigenvalue |
| Related topic | EigenvalueProblem |
| Related topic | SimilarMatrix |
| Related topic | DiagonalizationLinearAlgebra |
| Defines | scalar multiple |

Let A be an $n \times n$ square matrix and x an $n \times 1$ column vector. Then a (right) *eigenvector* of A is a nonzero vector x such that

$$Ax = \lambda x$$

for some scalar λ , i.e. such that the image of x under the transformation A is a *scalar* of x . One can similarly define left eigenvectors in the case that A acts on the right.

One can find eigenvectors by first finding eigenvalues, then for each eigenvalue λ_i , solving the system

$$(A - \lambda_i I)x_i = 0$$

to find a form which characterizes the eigenvector x_i (any of x_i is also an eigenvector). Of course, this is not necessarily the best way to do it; for this, see singular value decomposition.