

verifying eigenvectors

exercise 1

Consider the matrix $A = \begin{bmatrix} 0 & 6 & 8 \\ 1/2 & 0 & 0 \\ 0 & 1/2 & 0 \end{bmatrix}$ and vectors $\vec{v}_1 = \begin{bmatrix} 16 \\ 4 \\ 1 \end{bmatrix}$ and $\vec{v}_2 = \begin{bmatrix} 2 \\ 2 \\ 2 \end{bmatrix}$.

Which are eigenvectors? What are their eigenvalues?

the characteristic polynomial

Is there a method for computing all of the eigenvalues of a matrix?

YES!

by finding the roots of **the characteristic polynomial** (i.e. solving a nonlinear equation in one variable)

- The characteristic polynomial is in fact a polynomial
- The point of the characteristic polynomial is that we can use it to compute eigenvalues
- Finding the characteristic polynomial means computing the determinant of the matrix $\det(A - \lambda I)$ whose entries contain the unknown λ