

Math 4133 - Linear Algebra

Quiz #20 - 2013.04.01

Solutions

1. How does one compute the eigenvectors of a square $n \times n$ matrix A ?

We solve the eigenvalue-eigenvector equation $(A - \lambda I)\vec{v} = \vec{0}$, or $A\vec{v} = \lambda\vec{v}$, where λ is an eigenvalue of A .

2. Why do we diagonalize a matrix A to compute e^A ?

When diagonalized, $A = QDQ^{-1}$, and since D is diagonal, its exponential is e^D , whilst the Q and Q^{-1} powers cancel, so they need not be computed, thus $e^A = Qe^DQ^{-1}$.