1. Gram-Schmidt process.

Let the vectors in the basis for U be , , and . Then find vectors by the Gram-Schmidt process:

Thus, an orthogonal basis for U consists of the vectors . To check that they are orthogonal, calculate dot products between all vectors:

Therefore, the vectors are orthogonal.

1. matrix A.
2. Diagonalisation.

Since the characteristic polynomial of A is the eigenspaces can be found from eigenvalues , respectively. When

Then

When

Then

Let and . Since A is a matrix with 2 linearly independent eigenvectors , A is diagonalisable. Furthermore, let P be the matrix and let D be the matrix . Then the equation is satisfied by the diagonalisation of A.