MathQuest: Linear Algebra

Eigenspaces

1. If a vector x is in the eigenspace of A corresponding to λ, and $\lambda \neq 0$, then x is

   (a) in the nullspace of the matrix A.

   (b) in the nullspace of the matrix $A - \lambda I$.

   (c) not the zero vector.

   (d) More than one of the above correctly completes the sentence.

2. Which of the following statements is correct?

   (a) The set of eigenvectors of a matrix A forms the eigenspace of A.

   (b) The set of eigenvectors of a matrix A spans the eigenspace of A.

   (c) Since any multiple of an eigenvector is also an eigenvector, the eigenspace always has infinite dimension.

   (d) More than one of the above statements are correct.

   (e) None of the above statements are correct.

3. Which of the following statements is correct?

   (a) The set of eigenvectors of a matrix A corresponding to a particular eigenvalue λ_1, together with the zero vector, forms the eigenspace of A corresponding to λ_1.

   (b) An eigenspace corresponding to a non-repeated eigenvalue has dimension one.

   (c) An eigenvalue of multiplicity two has a corresponding eigenspace of dimension two.

   (d) All of the above statements are correct.

   (e) Exactly two of the above statements are correct.