Linear Algebra Learning Objectives[1]

1. Determine whether an equation is linear; know when a system of linear equations has solutions, and find solutions using Gaussian elimination.

2. Manipulate vectors in $\mathbb{R}^n$ and matrices algebraically; mulitply matrices and find matrix inverses.

3. Prove facts about vector spaces and subspaces; determine whether a given subset is a subspace; and determine when sets of vectors are linearly independent, spanning sets, and/or bases.

4. Find the row, column, and nullspaces of matrices; identify linear transformations and find their kernels and images.

5. Use dot products and inner products to project one vector onto another, and use this to find orthogonal decompositions of vectors with respect to given subspaces.

6. Compute the determinant and trace of a matrix; determine whether a vector is an eigenvector of a given matrix; find the eigenvectors and eigenvalues of a matrix; use eigenvectors to diagonalize a matrix.

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[1]This list was approved by the department on 5/3/19.