More Detailed List of Topics

Linear Equations in Linear Algebra

Systems of Linear Equations
Row Reduction and Echelon Forms
Vector Equations
The Matrix Equation **Ax = b**
Solution Sets of Linear Systems
Applications of Linear Systems
Linear Independence
Introduction to Linear Transformations
The Matrix of a Linear Transformation
Linear Models in Business, Science, and Engineering

Matrix Algebra

Matrix Operations
The Inverse of a Matrix
Characterizations of Invertible Matrices
Partitioned Matrices
Matrix Factorizations
The Leontief Input—Output Model
Applications to Computer Graphics
Subspaces of R^n
Dimension and Rank

Vector Spaces

Vector Spaces and Subspaces
Null Spaces, Column Spaces, and Linear Transformations
Linearly Independent Sets; Bases
Coordinate Systems
The Dimension of a Vector Space
Rank; Change of Basis
Applications to Markov Chains

Eigenvalues and Eigenvectors

Eigenvectors and Eigenvalues
The Characteristic Equation
Diagonalization
Eigenvectors and Linear Transformations

Determinants

Introduction to Determinants
Properties of Determinants

Finite-State Markov Chains

Google and Markov Chains
The Steady-State Vector and Google's PageRank

Orthogonality and Least Squares

Inner Product, Length, and Orthogonality
Orthogonal Sets
Orthogonal Projections
The Gram—Schmidt Process
Least-Squares Problems