

Linear Algebra

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Linear Algebra I

1. Fields, Vector Spaces, Subspaces.
2. Subspaces, Linear Dependence, Basis.
3. Linear Dependence, Basis.
4. Basis, Replacement Theorem, Dimension.
5. Linear Transformation, Kernel, Range, Dimension Theorem.
6. Dimension Theorem, Projection.
7. Matrix Representations.
8. Matrix Representations, Invertible Linear Transformations.
9. Invertible Linear Transformations, Change of Coordinates.
10. Elementary Matrices.
11. Elementary Matrices, Gaussian Elimination.
12. Gaussian Elimination, Determinant of Order 2.
13. Determinants.
14. Determinants(in Terms of Permutations),Cramer's Rule,Adjoint Matrices.
15. Diagonalization
16. Diagonalization
17. Invariant Subspaces, Cayley-Hamilton Theorem
18. Jordan forms, generalized eigenspaces (w. notes)
19. Jordan forms
20. Jordan forms.
21. Jordan forms.

22. Exponential of matrices
23. Systems of first order differential equations, minimal polynomials.
24. Rational canonical forms.
25. Rational canonical forms.
26. Rational canonical forms.

Linear Algebra II

1. Dual Spaces
2. Quotient Spaces
3. Inner Product Space
4. Inner Product Space, Gram-Schmidt Process
5. Orthogonal Projection
6. Hilbert Space, Riesz Representation Theorem
7. Riesz Representation Theorem
8. Adjoint Operators, Normal Operators
9. Normal and Self adjoint Operators
10. Positive semidefinite, Orthogonal and Unitary operators
11. Orthogonal and Unitary operators
12. Orthogonal projection, Spectral theorem
13. Spectral theorem, Simultaneous diagonalization of normal operators
14. Singular value decomposition, Polar decomposition
15. Pseudoinverse
16. Pairs of commuting matrices over a finite field
17. Pairs of commuting matrices over a finite field

18. [Bilinear forms](#)
19. [Bilinear forms, Quadratic forms](#)
20. [Quadratic forms](#)
21. [Quadratic spaces](#)
22. [Quadratic spaces](#)
23. [Witt decomposition theorem](#)
24. [Cartan-Dieudonné theorem](#)
25. [Cartan-Dieudonné theorem](#)
26. [Bézout's theorem](#)
27. [Bézout's theorem](#)

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