Linear Algebra I - By The Hour Summary

September-28-09
4:22 PM

1. Definition of a field, some examples and "silly properties".
2. Cont.
3. The complex numbers.
4. Inverses in C, the geometrical picture, Z/p.
5. Cont.
6. Vector spaces, examples.
7. Polynomials, minor properties of V.S., subspaces, intersections and unions.
8. Cont.
9. Linear combinations.
10. Goal: "All V.S. are the "same"". "Generates/spans", linear independence,
11. Cont.
12. Subsets/supersets of dep/indep sets. Bases. Unique expression as l.c. A generating set has a subset which is a basis.
13. The replacement lemma, all bases have the same number of elements, corollaries.
14. Cont.
15. More on bases, also for subspaces.
16. Interpolation by polynomials, linear transformations, examples.
17. Cont.
18. More examples, "isomorphism", all f.d. v.s. are isomorphic to F^n.
19. Ker, Im, the dimension theorem, equivalent conditions for invertability.
20. Cont.
21. Linear transformations and bases.
22. Cont.
23. Composition and matrix multiplication.
24. More on matrices and transformations, good and bad news on matrix algebra, computing ranks and inverses.
25. Cont.
26. "Interpretation" following Wanmike and "Review of last class" handout.
27. Properties of rank, "reduced row echelon form", matrix inversion.
28. Cont.
29. Systems of equations.
30. Determinants: recursive definition.
31. Cont.
32. Determinants: axiomatic properties, basic properties.
33. Determinants: products, inverses, volume. The reproductive biology of rabbits.
34. Cont.
35. Changes of basis, eigenvalues and eigenvectors.
36. Powers and exponentiation.
37. Cont.
38. Changes of basis, again.