



MA219 Aug. 3:1

Linear Algebra

Instructor

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Teaching Assistant

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Department: Mathematics

Course Time: Mon., Wed., Fri., 11 AM-12 PM

Lecture venue: LH-4, Dept. of Mathematics

tailed Course Page: <https://sites.google.com/site/somuhompage/home/httpssitesgooglecomsitesomuhompagehomeTeachi>

Announcements

Brief description of the course

1st year Int-PhD, 5th sem UG, similar level students from other depts., including PhD students. The course studies linear equations, their solutions, matrices and applications. Linear algebra is used in all branches of mathematics. Many of our day to day experiences can be put in to the framework of systems of linear equations; and this course discusses such equations in detail.

Prerequisites

none

Syllabus

Vector spaces: Definition, Basis and dimension, Direct sums. Linear transformations: Definition, Rank-nullity theorem, Algebra of linear transformations, Dual spaces, Matrices.

Systems of linear equations: elementary theory of determinants, Cramer's rule. Eigenvalues and eigenvectors, the characteristic polynomial, the Cayley- Hamilton Theorem, the minimal polynomial, algebraic and geometric multiplicities, Diagonalization, The Jordan canonical form. Symmetry: Group of

motions of the plane, Discrete groups of motion, Finite groups of $SO(3)$. Bilinear forms: Symmetric, skew symmetric and Hermitian forms, Sylvester's law of inertia, Spectral theorem for the Hermitian and normal operators on finite dimensional vector spaces.

Course outcomes

Solving linear equations, working with matrices, in particular eigenvalues and eigenvectors, and applying the techniques to real life problems like graph theory, computer science, electronics and applied mathematics. Spectral theorems, prevalent in many branches of mathematics.

Grading policy

20% for quizzes, 30% for mid-term, 50% for end-term.

Assignments

Available at

<https://sites.google.com/site/somuhompage/home/httpssitesgooglecomsitesomuhompagehomeTeaching>

Resources

- 1) Artin, M., Algebra ,Prentice_Hall of India, 1994.
- 2) Halmos, P., Finite dimensional vector spaces ,Springer-Verlag (UTM), 1987.
- 3) Hoffman, K. and Kunze, R., Linear Algebra (2nd Ed.) ,Prentice-Hall of India, 1992.