
An Introduction to
**LINEAR ALGEBRA
AND TENSORS**

M. A. AKIVIS
V. V. GOLDBERG

Revised English Edition
Translated and Edited by
Richard A. Silverman

|
-
|

DOVER PUBLICATIONS, INC.
NEW YORK, N.Y.

CONTENTS

Editor's Preface, vii

1 LINEAR SPACES, Page 1.

1. Basic Concepts, 1.
2. Linear Dependence, 4.
3. Dimension and Bases, 8.
4. Orthonormal Bases. The Scalar Product, 12.
5. The Vector Product. Triple Products, 16.
6. Basis Transformations. Tensor Calculus, 22.
7. Topics in Analytic Geometry, 29.

2 MULTILINEAR FORMS AND TENSORS, Page 38.

8. Linear Forms, 38.
9. Bilinear Forms, 41.
10. Multilinear Forms. General Definition of a Tensor, 44.
11. Algebraic Operations on Tensors, 50.
12. Symmetric and Antisymmetric Tensors, 55.

3 LINEAR TRANSFORMATIONS, Page 64.

13. Basic Concepts, 64.
14. The Matrix of a Linear Transformation and Its Determinant, 68.
15. Linear Transformations and Bilinear Forms, 78.
16. Multiplication of Linear Transformations and Matrices, 87.
17. Inverse Transformations and Matrices, 94.
18. The Group of Linear Transformations and Its Subgroups, 98.

4 FURTHER TOPICS, Page 107.

19. Eigenvectors and Eigenvalues, 107.
20. The Case of Distinct Eigenvalues, 117.
21. Matrix Polynomials and the Hamilton-Cayley Theorem, 121.
22. Eigenvectors of a Symmetric Transformation, 124.
23. Diagonalization of a Symmetric Transformation, 127.
24. Reduction of a Quadratic Form to Canonical Form, 133.
25. Representation of a Nonsingular Transformation, 138.

SELECTED HINTS AND ANSWERS, Page 144.

BIBLIOGRAPHY, Page 161.

INDEX, Page 163.