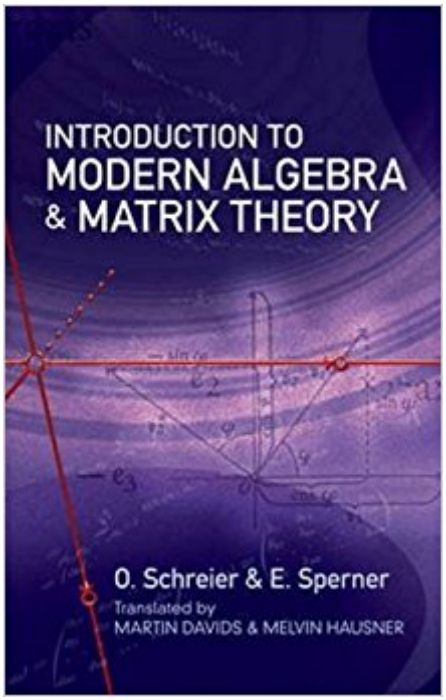
Introduction To Modern Algebra And Matrix Theory: Second Edition (Dover Books On Mathematics)



Synopsis

This unique text provides students with a single-volume treatment of the basics of calculus and analytic geometry. It reflects the teaching methods and philosophy of Otto Schreier, an influential mathematician and professor. The order of its presentation promotes an intuitive approach to calculus, and it offers a strong emphasis on algebra with minimal prerequisites.Starting with affine space and linear equations, the text proceeds to considerations of Euclidean space and the theory of determinants, field theory and the fundamental theorem of algebra, elements of group theory, and linear transformations and matrices. Numerous exercises at the end of each section form important supplements to the text.

Book Information

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Customer Reviews

First, a preamble regarding the book’s contents--as taken from the review for the Mathematical Association of America :"...more accurate to characterize this wonderful book as a thoroughgoing rendering of linear algebra at a concrete level ..."Now, The Mathematics Teacher: "Outstanding...good introduction...each topic is painstakingly developed."This is an unusual textbook. No Calculus to be found,yet, a good dose of mathematical maturity is presupposed inorder that a student will benefit most from its contents. We begin elementary enough: Points,Lines, Planes, thence tohyper-planes. Linear equations (this, the first chapter) given ample discussion surrounding interplay of geometry and algebra.Note well the discussion: Chapter One paves the

way for the remainder of the text. Concrete and Abstract always intertwinedin seamless fashion. The first chapter, of some Fifty pages, contains twenty (or more) Theorems and their respective proofs.Throw in the Exercises which accompany each section, many diagrams as accompaniment, and and one views dense thicket.If Chapter One proceeds with little incident, I would claim that the entirety of the text is well within student's grasp.Second chapter--a favorite--Determinants. Progressing from length to scalar product to area, then to volume, one seeks the(Page 68) all important "function which assigns to any set of n-vectors a uniquely determined real-functional value with thefollowing Properties...." Elaboration of the properties ensues for well over a hundred pages, with fine discussion of Rigid Motions.An absolute delight (Pages 153-178) is the elaboration of rigid motions in the Plane and Three-Space. A pretty proof "...that ifthe determinant is positive One, the dimension of the vector space is either one or three (that is,it cannot be two)..." Excellent.Third Chapter: Fields and the Fundamental Theorem of Algebra. Author: "We remove the restriction that our symbols representReal Numbers." Elementary Field theory followed by Polynomials, Complex Numbers, then, on to the Fundamental Theorem.In fact, Pages 218-228 give a fine abstract (yet elementary !) presentation of the "Field of Complex Numbers" with chapter endingon ten pages of meaningful discussion surrounding the Fundamental Theorem of Algebra. Excellent ending to an excellent chapter.Finite Groups in the following chapter is brief, though lucid (Axioms, Subgroups, Abelian); Reading, "Aside from these considerations,an important reason for our discussion was that it enabled us to introduce ideas and methods whose generalizations will be veryimportant for the theory of Matrices in the next chapter." Thus, groups discussed as prelude to Linear Transformations and Matrices:"We shall now concern ourselves with certain sub-spaces which are mapped into themselves", thus begins the wonderful expositionof Invariant Sub-spaces (nullspace, decompositions, geometric interpretation, unitary and orthogonal transformations) taking one tobook's end, and the " illustration of when a matrix can be transformed into one which has only zeros on one side of the main diagonal."A most satisfying and rewarding excursion. From elementary to advanced, from concrete to abstract. Some of the exercises arecomputational (concrete) , many others ask for the complete proofs of statements (abstract) ---thus, not entirely elementary.If the requisite mathematical maturity is possessed (or, acquired along the way) all will be accessible to an undergraduate student.A superb companion.

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