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**LINEAR  
ALGEBRA  
OVER  
COMMUTATIVE  
RINGS**

*Bernard R. McDonald*

# Linear Algebra Over Commutative Rings

**Ronghua Li, Zhongying Chen, Wei Wu**



## Linear Algebra Over Commutative Rings:

Linear Algebra over Commutative Rings Bernard R. McDonald, 2020-11-25 This monograph arose from lectures at the University of Oklahoma on topics related to linear algebra over commutative rings It provides an introduction of matrix theory over commutative rings The monograph discusses the structure theory of a projective module *Linear Systems over Commutative Rings* James W. Brewer, John W. Bunce, Fred S. Van Vleck, 1986-04-22 **Free Modules Over Commutative Rings** Silvana Mousa Jaber, American University of Beirut. Faculty of Arts and Sciences. Department of Mathematics and Computer Science, 2003 The object of the thesis is to show that some results from Linear Algebra are also valid over an arbitrary commutative ring  $R$  Of prime interest is the strong rank condition If  $R^m$  is embedded in  $R^n$  then  $m$  is less than or equal to  $n$  In particular cases one can prove this condition by using the notions of rank and uniform dimension So we present two proofs of the strong rank condition over any commutative ring  $R$  One proof makes a reduction to the Noetherian case The other proof uses a key property of the exterior wedge product of free modules due to Bourbaki We also discuss the relations between the strong rank condition and other conditions of free modules over  $R$  Finally we present an application to the theory of homogeneous linear equations over an arbitrary commutative ring **Handbook of Algebra**, 2003-10-15 **Handbook of Algebra** Theory of Generalized Inverses Over Commutative Rings K.P.S. Bhaskara Rao, 2002-03-21 The theory of generalized inverses of real or complex matrices has been expertly developed and documented But the generalized inverses of matrices over rings have received comprehensive treatment only recently In this book the author who contributed to the research and development of the theory explains his results The subject of generalized inverses of matrices over rings has now reached a state suitable for a comprehensive treatment this book provides just that for mathematicians algebraists and control theorists **Graphs, Matrices, and Designs** Rolf S. Rees, 2017-07-12 Examines partitions and covers of graphs and digraphs latin squares pairwise balanced designs with prescribed block sizes ranks and permanents extremal graph theory Hadamard matrices and graph factorizations This book is designed to be of interest to applied mathematicians computer scientists and communications researchers *C\* - Algebras and Numerical Analysis* Ronald Hagen, Steffen Roch, Bernd Silberman, 2000-09-07 Analyzes algebras of concrete approximation methods detailing prerequisites local principles and lifting theorems Covers fractality and Fredholmness Explains the phenomena of the asymptotic splitting of the singular values and more **Advanced Calculus (Revised Edition)** Lynn Harold Loomis, Shlomo Zvi Sternberg, 2014-02-26 An authorised reissue of the long out of print classic textbook *Advanced Calculus* by the late Dr Lynn Loomis and Dr Shlomo Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades This book is based on an honors course in advanced calculus that the authors gave in the 1960 s The foundational material presented in the unstarred sections of Chapters 1 through 11 was normally covered but different applications of this basic material were stressed from year to year and the book therefore contains more material than was covered in any one

year It can accordingly be used with omissions as a text for a year s course in advanced calculus or as a text for a three semester introduction to analysis The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view together with some acquaintance with linear algebra The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication As possible introductory texts we mention Differential and Integral Calculus by R Courant Calculus by T Apostol Calculus by M Spivak and Pure Mathematics by G Hardy The reader should also have some experience with partial derivatives In overall plan the book divides roughly into a first half which develops the calculus principally the differential calculus in the setting of normed vector spaces and a second half which deals with the calculus of differentiable manifolds **Generalized Difference**

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Edition is a valuable reference for all pure and applied mathematicians statisticians and mathematical analysts and an outstanding text for all graduate students in these disciplines

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