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# Rings, Modules and Linear Algebra

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*A further course in algebra describing  
the structure of Abelian groups and  
canonical forms of matrices through  
the study of rings and modules*

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# Rings Modules And Linear Algebra

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## **Rings Modules And Linear Algebra:**

Rings, Modules and Linear Algebra B. Hartley, Trevor O. Hawkes, 1970-09 An account of how a certain fundamental algebraic concept can be introduced developed and applied to solve some concrete algebraic problems **Rings, Modules and Linear Algebra** Brian Hartley, Trevor O. Hawkes, 1974 Rings, Modules and Linear Algebra Brian Hartley, 1974

**Rings, Modules and Linear Algebra** B. Hartley, T.O. Hawkes, 1970-09-01 *Foundations of Module and Ring Theory* Robert Wisbauer, 2018-05-11 This volume provides a comprehensive introduction to module theory and the related part of ring theory including original results as well as the most recent work It is a useful and stimulating study for those new to the subject as well as for researchers and serves as a reference volume Starting from a basic understanding of linear algebra the theory is presented and accompanied by complete proofs For a module  $M$  the smallest Grothendieck category containing it is denoted by  $\mathcal{O}M$  and module theory is developed in this category Developing the techniques in  $\mathcal{O}M$  is no more complicated than in full module categories and the higher generality yields significant advantages for example module theory may be developed for rings without units and also for non associative rings Numerous exercises are included in this volume to give further insight into the topics covered and to draw attention to related results in the literature Modules and the Structure of Rings Golan, 1991-04-24 This textbook is designed for students with at least one solid semester of abstract algebra some linear algebra background and no previous knowledge of module theory Modules and the Structure of Rings details the use of modules over a ring as a means of considering the structure of the ring itself explaining the mathematics and inductive reasoning used in working on ring theory challenges and emphasizing modules instead of rings Stressing the inductive aspect of mathematical research underlying the formal deductive style of the literature this volume offers vital background on current methods for solving hard classification problems of algebraic structures Written in an informal but completely rigorous style Modules and the Structure of Rings clarifies sophisticated proofs avoids the formalism of category theory aids independent study or seminar work and supplies end of chapter problems This book serves as an excellent primary text for upper level undergraduate and graduate students in one semester courses on ring or module theory laying a foundation for more advanced study of homological algebra or module theory *Algebra* Carl Faith, 2012-12-06 VI of Oregon lectures in 1962 Bass gave simplified proofs of a number of Morita Theorems incorporating ideas of Chase and Schanuel One of the Morita theorems characterizes when there is an equivalence of categories  $\text{mod } A \text{ R mod } B$  for two rings  $A$  and  $B$  Morita's solution organizes ideas so efficiently that the classical Wedderburn Artin theorem is a simple consequence and moreover a similarity class  $AJ$  in the Brauer group  $\text{Br } k$  of Azumaya algebras over a commutative ring  $k$  consists of all algebras  $B$  such that the corresponding categories  $\text{mod } A$  and  $\text{mod } B$  consisting of  $k$  linear morphisms are equivalent by a  $k$  linear functor For fields  $\text{Br } k$  consists of similarity classes of simple central algebras and for arbitrary commutative  $k$  this is subsumed under the Azumaya 51 1 and Auslander Goldman 60J Brauer group Numerous other instances of a wedding of ring

theory and category albeit a shot gun wedding are contained in the text Furthermore in my attempt to further simplify proofs notably to eliminate the need for tensor products in Bass's exposition I uncovered a vein of ideas and new theorems lying wholly within ring theory This constitutes much of Chapter 4 the Morita theorem is Theorem 4.29 and the basis for it is a correspondence theorem for projective modules Theorem 4.7 suggested by the Morita context As a by product this provides foundation for a rather complete theory of simple Noetherian rings but more about this in the introduction

*Lectures on Modules and Rings* Tsit-Yuen Lam, 1999 This new book can be read independently from the first volume and may be used for lecturing seminar and self study or for general reference It focuses more on specific topics in order to introduce readers to a wealth of basic and useful ideas without the hindrance of heavy machinery or undue abstractions User friendly with its abundance of examples illustrating the theory at virtually every step the volume contains a large number of carefully chosen exercises to provide newcomers with practice while offering a rich additional source of information to experts A direct approach is used in order to present the material in an efficient and economic way thereby introducing readers to a considerable amount of interesting ring theory without being dragged through endless preparatory material

**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

**An Introduction to Module Theory** Ibrahim Assem, Flávio U. Coelho, 2024-11-21 Module theory is a fundamental area of algebra taught in most universities at the graduate level This textbook written by two experienced teachers and researchers in the area is based on courses given in their respective universities over the last thirty years It is an accessible and modern account of module theory meant as a textbook for graduate or advanced undergraduate students though it can also be used for self study It is aimed at students in algebra or students who need algebraic tools in their work Following the recent trends in the area the general approach stresses from the start the use of categorical and homological techniques The book includes self contained introductions to category theory and homological algebra with applications to Module theory and also contains an introduction to representations of quivers It includes a very large number of examples of all kinds worked out in detail mostly of abelian groups modules over matrix algebras polynomial algebras or algebras given by bound quivers In order to help visualise and analyse examples it includes many figures Each section is followed by exercises of all levels of difficulty both computational and theoretical with hints provided to some of them

**Modules and the Structure of Rings** Golan, 2017-10-19 This textbook is designed for students with at least one solid semester of abstract algebra some linear algebra background and no previous knowledge of module theory *Modules and the Structure of Rings* details the use of modules over a ring as a means of considering the structure of the ring itself explaining the mathematics and inductive reasoning used in working on ring theory challenges and emphasizing modules instead of rings Stressing the

inductive aspect of mathematical research underlying the formal deductive style of the literature this volume offers vital background on current methods for solving hard classification problems of algebraic structures Written in an informal but completely rigorous style Modules and the Structure of Rings clarifies sophisticated proofs avoids the formalism of category theory aids independent study or seminar work and supplies end of chapter problems This book serves as an excellent primary text for upper level undergraduate and graduate students in one semester courses on ring or module theory laying a foundation for more advanced study of homological algebra or module theory

**Rings, Modules and Codes** André Leroy, Christian Lomp, Sergio López-Permouth, Frédérique Oggier, 2019-04-12 This book contains the proceedings of the Fifth International Conference on Noncommutative Rings and their Applications held from June 12-15 2017 at the University of Artois Lens France The papers are related to noncommutative rings covering topics such as ring theory with both the elementwise and more structural approaches developed module theory with popular topics such as automorphism invariance almost injectivity ADS and extending modules and coding theory both the theoretical aspects such as the extension theorem and the more applied ones such as Construction A or Reed Muller codes Classical topics like enveloping skewfields weak Hopf algebras and tropical algebras are also presented

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**Exercises in Basic Ring Theory** Grigore Calugareanu, P. Hamburg, 2013-03-09 Each undergraduate course of algebra begins with basic notions and results concerning groups rings modules and linear algebra That is it begins with simple notions and simple results Our intention was to provide a collection of exercises which cover only the easy part of ring theory what we have named the Basics of Ring Theory This seems to be the part each student or beginner in ring theory or even algebra should know but surely trying to solve as many of these exercises as possible independently As difficult or impossible as this may seem we have made every effort to avoid modules lattices and field extensions in this collection and to remain in the ring area as much as possible A brief look at the bibliography obviously shows that we don't claim much originality one could name this the folklore of ring theory for the statements of the exercises we have chosen but this was a difficult task indeed the 28 titles contain approximately 15 000 problems and our collection contains only 346 The real value of our book is the part which contains all the solutions of these exercises We have tried to draw up these solutions as detailed as possible so that each beginner can progress without skilled help The book is divided in two parts each consisting of seventeen chapters the first part containing the exercises and the second part the solutions

**Soviet Mathematics (Iz. VUZ).** Soviet Union. Ministerstvo vysshego i srednego spetsial'nogo obrazovaniia, 1979

**Library of Congress Catalog** Library of Congress, 1970

**The Mathematical Gazette**, 1991

**Introduction to Algebraic K-theory** John R. Silvester, 1981

**Library of Congress Catalogs** Library of Congress, 1976

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