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1MG38Q - BRAXTON HOOPER

Electronics and Instrumentation, Volume 36: Basic Matrix Analysis and Synthesis presents the application of matrix methods to practical electronics problems. This book focuses on transistor applications. Organized into three parts, this volume begins with an overview of the fundamental theory of twoports and explains the mechanisms of matrix and determinant operations with applications to the study of twoport networks, both active and passive. This text then explains the concept of impedance transformation and image matching in the different matrix domains. This book presents as well the analysis and synthesis of active networks. The final part deals with the mathematical model concepts of transistors and vacuum tubes that are freely applied to a wide range of problems with an emphasis on practical applications

such as conventional amplifiers, single-, and multi-stage transistor feedback amplifiers and oscillators. This book is a valuable resource for electronics engineers as well as for students with some grounding in mathematics and network theory.

Basic Matrix Algebra and Transistor Circuits deals with mastering the techniques of matrix algebra for application in transistors. This book attempts to unify fundamental subjects, such as matrix algebra, four-terminal network theory, transistor equivalent circuits, and pertinent design matters. Part I of this book focuses on basic matrix algebra of four-terminal networks, with descriptions of the different systems of matrices. This part also discusses both simple and complex network configurations and their associated transmission. This discussion is followed by the alternative methods of deriving the transmission matrix using Kirchhoff's law. Part

It introduces matrix analysis of transistor circuits, and then shows in detail the three transistor configurations: common-base, common-emitter, and common collector. A step-by-step method of transmission matrices derivation for each transistor configuration is then explained. This book notes the significance of matrix algebra in dealing with amplifier problems in a variety of output network configurations. Part III focuses on several aspects of single-stage transistor amplifier design. This part explains how matrix algebra can be used to derive the exact input, output impedances, and the reverse transfer properties of transistor amplifiers with full load and generator terminations. Through mathematical analysis, the book shows the accuracy of matrix analysis in transistor amplifier design. This book is suitable for design engineers, electrical engineers, and students and practitioners of applied mathematics.

Clear prose, tight organization, and a wealth of examples and computational techniques make *Basic Matrix Algebra with Algorithms and Applications* an outstanding introduction to linear algebra. The author designed this treatment specifically for freshman majors in mathematical subjects and upper-level students in natural resources, the social sciences, business, or any discipline that eventually requires an understanding of linear models. With extreme pedagogical clarity that avoids abstraction wherever possible, the author emphasizes minimal polynomials and their computation using a Krylov algorithm. The presentation is highly visual and relies heavily on work with a graphing calculator to allow readers to focus on concepts and techniques rather than on tedious arithmetic. Supporting materials, including test preparation Maple worksheets, are available for download from the Internet.

This unassuming but insightful and remarkably original treatment is organized into bite-sized, clearly stated objectives. It goes well beyond the LACSG recommendations for a first course while still implementing their philosophy and core material. Classroom tested with great success, it prepares readers well for the more advanced studies their fields ultimately will require.

Intended for undergraduate and graduate students of mathematics, engineering, and social sciences, this volume is arranged in such a way that a beginner can easily grasp the material step by step, and the theories are made lucid through illustrated examples. (Mathematics)

"A First Course in Linear Algebra, originally by K. Kuttler, has been redesigned by the Lyryx editorial team as a first course for the general students who have an understanding of basic high school algebra and intend to be users of linear algebra methods in their profession, from business & economics to science students. All major topics of linear algebra are available in detail, as well as justifications of important results. In addition, connections to topics covered in advanced courses are introduced. The textbook is designed in a modular fashion to maximize flexibility and facilitate adaptation to a given course outline and student profile. Each chapter begins with a list of student learning outcomes, and examples and diagrams are given throughout the text to reinforce ideas and provide guidance on how to approach various problems. Suggested exercises are included at the end of each section, with selected answers at the end of the textbook."--BC-campus website.

Basic textbook covers theory of matrices and its applications to

systems of linear equations and related topics such as determinants, eigenvalues, and differential equations. Includes numerous exercises.

Linear algebra is something all mathematics undergraduates and many other students, in subjects ranging from engineering to economics, have to learn. The fifth edition of this hugely successful textbook retains all the qualities of earlier editions while at the same time seeing numerous minor improvements and major additions. The latter include:

- A new chapter on singular values and singular vectors, including ways to analyze a matrix of data
- A revised chapter on computing in linear algebra, with professional-level algorithms and code that can be downloaded for a variety of languages
- A new section on linear algebra and cryptography
- A new chapter on linear algebra in probability and statistics.

A dedicated and active website also offers solutions to exercises as well as new exercises from many different sources (e.g. practice problems, exams, development of textbook examples), plus codes in MATLAB, Julia, and Python.

College Algebra provides a comprehensive exploration of algebraic principles and meets scope and sequence requirements for a typical introductory algebra course. The modular approach and richness of content ensure that the book meets the needs of a variety of courses. College Algebra offers a wealth of examples with detailed, conceptual explanations, building a strong foundation in the material before asking students to apply what they've learned. Coverage and Scope In determining the concepts, skills, and topics to cover, we engaged dozens of highly experienced instructors with a range of student audiences. The resulting scope and sequence proceeds logically while allowing for a significant

amount of flexibility in instruction. Chapters 1 and 2 provide both a review and foundation for study of Functions that begins in Chapter 3. The authors recognize that while some institutions may find this material a prerequisite, other institutions have told us that they have a cohort that need the prerequisite skills built into the course. Chapter 1: Prerequisites Chapter 2: Equations and Inequalities Chapters 3-6: The Algebraic Functions Chapter 3: Functions Chapter 4: Linear Functions Chapter 5: Polynomial and Rational Functions Chapter 6: Exponential and Logarithm Functions Chapters 7-9: Further Study in College Algebra Chapter 7: Systems of Equations and Inequalities Chapter 8: Analytic Geometry Chapter 9: Sequences, Probability and Counting Theory

This textbook addresses itself to two groups of students who need mathematics in an applied context: undergraduates starting at the beginning, and postgraduates who need reference-material, but who, not being mathematics specialists, nevertheless are not best served by an ordinary mathematics textbook, which will generally be at a higher level of abstraction. It gives full proofs throughout, and is illustrated with a large number of numerical examples, reinforcing the student's grasp of the topics covered by exercises and corresponding answersheets, and by the corresponding tutorial program ILLUSTRATE. The program 'Illustrate' will run on any IBM compatible micro-computer. The relevant areas of application are economics, econometrics, mathematical programming and engineering.

A stand-alone textbook in matrix algebra for econometricians and statisticians - advanced undergraduates, postgraduates and teachers.

A Thorough Guide to Elementary Matrix Algebra and Implementation in R Basics of Matrix Algebra for Statistics with R provides a guide to elementary matrix algebra sufficient for undertaking specialized courses, such as multivariate data analysis and linear models. It also covers advanced topics, such as generalized inverses of singular and rectangular matrices and manipulation of partitioned matrices, for those who want to delve deeper into the subject. The book introduces the definition of a matrix and the basic rules of addition, subtraction, multiplication, and inversion. Later topics include determinants, calculation of eigenvectors and eigenvalues, and differentiation of linear and quadratic forms with respect to vectors. The text explores how these concepts arise in statistical techniques, including principal component analysis, canonical correlation analysis, and linear modeling. In addition to the algebraic manipulation of matrices, the book presents numerical examples that illustrate how to perform calculations by hand and using R. Many theoretical and numerical exercises of varying levels of difficulty aid readers in assessing their knowledge of the material. Outline solutions at the back of the book enable readers to verify the techniques required and obtain numerical answers. Avoiding vector spaces and other advanced mathematics, this book shows how to manipulate matrices and perform numerical calculations in R. It prepares readers for higher-level and specialized studies in statistics.

From machine learning and data science to engineering and finance, linear algebra is an important prerequisite for the careers of today and of the future. There aren't many resources out there that give simple detailed examples and that walk you through the topics step by step. Many resources out there are ei-

ther too dry or too difficult. This book aims to teach linear algebra step-by-step with examples that are simple but concrete.

This is an introductory textbook designed for undergraduate mathematics majors with an emphasis on abstraction and in particular, the concept of proofs in the setting of linear algebra. Typically such a student would have taken calculus, though the only prerequisite is suitable mathematical grounding. The purpose of this book is to bridge the gap between the more conceptual and computational oriented undergraduate classes to the more abstract oriented classes. The book begins with systems of linear equations and complex numbers, then relates these to the abstract notion of linear maps on finite-dimensional vector spaces, and covers diagonalization, eigenspaces, determinants, and the Spectral Theorem. Each chapter concludes with both proof-writing and computational exercises.

Conducted under the umbrella of Project Gunrunner, intended to stem the flow of firearms to Mexico, the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) ran a series of gun walking sting operations, including Operations Wide Receiver and Operation Fast & Furious. The government allowed licensed gun dealers to sell weapons to illegal straw buyers so that they could continue to track the firearms as they were transferred to higher-level traffickers and key figures in Mexican cartels. Motivated by a sense of patriotic duty, Tucson gun dealer and author Mike Detty alerted the local ATF office when he was first approached by suspected cartel associates. Detty made the commitment and assumed the risks involved to help the feds make their case, often selling guns to these thugs from his home in the dead of night.

Originally informed that the investigation would last just weeks, Detty's undercover involvement in Operation Wide Receiver, the precursor to Operation Fast & Furious, which was by far the largest gun walking probe, stretched on for an astonishing and dangerous three years. Though the case took several twists and turns, perhaps the cruelest turn was his betrayal by the very agency he risked everything to help.

Since 2002, the Introduction to Matrix Algebra book has been downloaded by more than 30,000 users from 50 different countries. This book is an extended primer for undergraduate Matrix Algebra. The book is either to be used as a refresher material for students who have already taken a course in Matrix Algebra or used as a just-in-time tool if the burden of teaching Matrix Algebra has been placed on several courses. In my own department, the Linear Algebra course was taken out of the curriculum a decade ago. It is now taught just in time in courses like Statics, Programming Concepts, Vibrations, and Controls. There are ten chapters in the book 1) INTRODUCTION, 2) VECTORS, 3) BINARY MATRIX OPERATIONS, 4) UNARY MATRIX OPERATIONS, 5) SYSTEM OF EQUATIONS, 6) GAUSSIAN ELIMINATION, 7) LU DECOMPOSITION, 8) GAUSS-SEIDAL METHOD, 9) ADEQUACY OF SOLUTIONS, 10) EIGENVALUES AND EIGENVECTORS.

The strength of this textbook lies in the careful exposition of mathematical thinking, basic set-theoretic notions, and proof techniques combined with contemporary numerical methods used throughout the book. A basic version of computer programs compatible with the widely used program MatLab, and exercises are provided on a disk included with the book. Warmup * Matrix Operations * Invertible Matrices * Subspaces * Rank and Dimension *

Geometry * Determinants-I * Diagonalization * Differential Equations * Hermitian Matrices * Triangular Matrices * Unitary Matrices * Block Diagonalization * Jordan Normal Form * Determinants-II * Proofs * Mathematical Induction† * Summary of MINIMAT * Answers * MINIMAT Tutorial (PC Version)

Linear algebra is one of the most important subjects in the study of science and engineering because of its widespread applications in social or natural science, computer science, physics, or economics. As one of the most useful courses in undergraduate mathematics, it has provided essential tools for industrial scientists. The basic concepts of linear algebra are vector spaces, linear transformations, matrices and determinants, and they serve as an abstract language for stating ideas and solving problems. This book is based on the lectures delivered several years in a sophomore level linear algebra course designed for science and engineering students. The primary purpose of this book is to give a careful presentation of the basic concepts of linear algebra as a coherent part of mathematics, and to illustrate its power and usefulness through applications to other disciplines. We have tried to emphasize the computational skills along with the mathematical abstractions, which have also an integrity and beauty of their own. The book includes a variety of interesting applications with many examples not only to help students understand new concepts but also to practice wide applications of the subject to such areas as differential equations, statistics, geometry, and physics. Some of those applications may not be central to the mathematical development and may be omitted or selected in a syllabus at the discretion of the instructor.

This text for a second course in linear algebra, aimed at math majors and graduates, adopts a novel approach by banishing determinants to the end of the book and focusing on understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. For example, the book presents - without having defined determinants - a clean proof that every linear operator on a finite-dimensional complex vector space has an eigenvalue. The book starts by discussing vector spaces, linear independence, span, basics, and dimension. Students are introduced to inner-product spaces in the first half of the book and shortly thereafter to the finite-dimensional spectral theorem. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. This second edition features new chapters on diagonal matrices, on linear functionals and adjoints, and on the spectral theorem; some sections, such as those on self-adjoint and normal operators, have been entirely rewritten; and hundreds of minor improvements have been made throughout the text.

Basic Linear Algebra is a text for first year students leading from concrete examples to abstract theorems, via tutorial-type exercises. More exercises (of the kind a student may expect in examination papers) are grouped at the end of each section. The book covers the most important basics of any first course on linear algebra, explaining the algebra of matrices with applications to analytic geometry, systems of linear equations, difference equations and complex numbers. Linear equations are treated via Hermite normal forms which provides a successful and concrete explanation of the notion of linear independence. Another important high-

light is the connection between linear mappings and matrices leading to the change of basis theorem which opens the door to the notion of similarity. This new and revised edition features additional exercises and coverage of Cramer's rule (omitted from the first edition). However, it is the new, extra chapter on computer assistance that will be of particular interest to readers: this will take the form of a tutorial on the use of the "LinearAlgebra" package in MAPLE 7 and will deal with all the aspects of linear algebra developed within the book.

Learn to: Solve linear algebra equations in several ways Put data in order with matrices Determine values with determinants Work with eigenvalues and eigenvectors Your hands-on guide to real-world applications of linear algebra Does linear algebra leave you feeling lost? No worries — this easy-to-follow guide explains the how and the why of solving linear algebra problems in plain English. From matrices to vector spaces to linear transformations, you'll understand the key concepts and see how they relate to everything from genetics to nutrition to spotted owl extinction. Line up the basics — discover several different approaches to organizing numbers and equations, and solve systems of equations algebraically or with matrices Relate vectors and linear transformations — link vectors and matrices with linear combinations and seek solutions of homogeneous systems Evaluate determinants — see how to perform the determinant function on different sizes of matrices and take advantage of Cramer's rule Hone your skills with vector spaces — determine the properties of vector spaces and their subspaces and see linear transformation in action Tackle eigenvalues and eigenvectors — define and solve for eigenvalues and eigenvectors and understand how they interact with spe-

cific matrices Open the book and find: Theoretical and practical ways of solving linear algebra problems Definitions of terms throughout and in the glossary New ways of looking at operations How linear algebra ties together vectors, matrices, determinants, and linear transformations Ten common mathematical representations of Greek letters Real-world applications of matrices and determinants

This book contains an extensive collection of exercises and problems that address relevant topics in linear algebra. Topics that the author finds missing or inadequately covered in most existing books are also included. The exercises will be both interesting and helpful to an average student. Some are fairly routine calculations, while others require serious thought. The format of the questions makes them suitable for teachers to use in quizzes and assigned homework. Some of the problems may provide excellent topics for presentation and discussions. Furthermore, answers are given for all odd-numbered exercises which will be extremely useful for self-directed learners. In each chapter, there is a short background section which includes important definitions and statements of theorems to provide context for the following exercises and problems.

This much-needed work presents, among other things, the relevant aspects of the theory of matrix algebra for applications in statistics. Written in an informal style, it addresses computational issues and places more emphasis on applications than existing texts.

This unique text provides students with a basic course in both calculus and analytic geometry. It promotes an intuitive approach to

calculus and emphasizes algebraic concepts. Minimal prerequisites. Numerous exercises. 1951 edition.

This textbook introduces students of economics to the fundamental notions and instruments in linear algebra. Linearity is used as a first approximation to many problems that are studied in different branches of science, including economics and other social sciences. Linear algebra is also the most suitable to teach students what proofs are and how to prove a statement. The proofs that are given in the text are relatively easy to understand and also endow the student with different ways of thinking in making proofs. Theorems for which no proofs are given in the book are illustrated via figures and examples. All notions are illustrated appealing to geometric intuition. The book provides a variety of economic examples using linear algebraic tools. It mainly addresses students in economics who need to build up skills in understanding mathematical reasoning. Students in mathematics and informatics may also be interested in learning about the use of mathematics in economics.

A recapitulation of his earlier work *Seeds of Contemplation*, this collection of sixteen essays plumbs aspects of human spirituality. Merton addresses those in search of enduring values, fulfillment, and salvation in prose that is, as always, inspiring and compassionate. "A stimulating series of spiritual reflections which will prove helpful for all struggling to...live the richest, fullest and noblest life" (Chicago Tribune).

Elementary, concrete approach: fundamentals of matrix algebra, linear transformation of the plane, application of properties of eigenvalues and eigenvectors to study of conics. Includes proofs of

most theorems. Answers to odd-numbered exercises.

A brief introduction to scientific computing with GNU Octave. Designed as a textbook supplement for freshman and sophomore level linear algebra and calculus students.

This is the first book on linear algebra written specifically for social scientists. It deals only with those aspects of the subject applicable in the social sciences and provides a thorough understanding of linear algebra for those who wish to use it as a tool in the design, execution, and interpretation of research. Linear mathematical models play an important role in all of the social sciences. This book provides a step-by-step introduction to those parts of linear algebra which are useful in such model building. It illustrates some of the applications of linear analysis and helps the reader learn how to convert his formulation of a social science problem into algebraic terms. The author covers matrix algebra, computational methods, linear models involving discrete variables, and clear, complete explanations of necessary mathematical concepts. Prior knowledge of calculus is not required since no use is made of calculus or of complex numbers. A novel feature of the mathematical content of the book is the treatment of models expressed in terms of variables which must be whole numbers (integers). The book is distinguished by a step-by-step exposition that allows the reader to grasp quickly and fully the principles of linear algebra. All of the examples used to illustrate the text are drawn from the social sciences, enabling the reader to relate the subject to concrete problems in his field. Exercises are included as a necessary part of the text to develop points not covered in the text and to provide practice in the algebraic formulation of applied problems. An appendix gives solutions (or hints) for select-

ed exercises.

"I recommend this book for its extensive coverage of topics not easily found elsewhere and for its focus on applications". Zentralblatt MATH "The book is an excellent source on linear algebra, matrix theory and applications in statistics and econometrics, and is unique in many ways. I recommend it to anyone interested in these disciplines, and especially in how they benefit from one another". Statistical Papers, 2000

This book on linear algebra and geometry is based on a course given by renowned academician I.R. Shafarevich at Moscow State University. The book begins with the theory of linear algebraic equations and the basic elements of matrix theory and continues with vector spaces, linear transformations, inner product spaces, and the theory of affine and projective spaces. The book also includes some subjects that are naturally related to linear algebra but are usually not covered in such courses: exterior algebras, non-Euclidean geometry, topological properties of projective spaces, theory of quadrics (in affine and projective spaces), decomposition of finite abelian groups, and finitely generated periodic modules (similar to Jordan normal forms of linear operators). Mathematical reasoning, theorems, and concepts are illustrated with numerous examples from various fields of mathematics, including differential equations and differential geometry, as well as from mechanics and physics.

Basic Algebra and Advanced Algebra systematically develop concepts and tools in algebra that are vital to every mathematician, whether pure or applied, aspiring or established. Together, the two books give the reader a global view of algebra and its role in

mathematics as a whole. The presentation includes blocks of problems that introduce additional topics and applications to science and engineering to guide further study. Many examples and hundreds of problems are included, along with a separate 90--page section giving hints or complete solutions for most of the problems.

Matrix algebra is one of the most important areas of mathematics for data analysis and for statistical theory. This much-needed work presents the relevant aspects of the theory of matrix algebra for applications in statistics. It moves on to consider the various types of matrices encountered in statistics, such as projection matrices and positive definite matrices, and describes the special properties of those matrices. Finally, it covers numerical linear algebra, beginning with a discussion of the basics of numerical computations, and following up with accurate and efficient algorithms for factoring matrices, solving linear systems of equations, and extracting eigenvalues and eigenvectors.

A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

This textbook emphasizes the interplay between algebra and geometry to motivate the study of linear algebra. Matrices and linear transformations are presented as two sides of the same coin, with their connection motivating inquiry throughout the book. By focusing on this interface, the author offers a conceptual appreciation of the mathematics that is at the heart of further theory and applications. Those continuing to a second course in linear algebra will appreciate the companion volume *Advanced Linear and*

Matrix Algebra. Starting with an introduction to vectors, matrices, and linear transformations, the book focuses on building a geometric intuition of what these tools represent. Linear systems offer a powerful application of the ideas seen so far, and lead on to the introduction of subspaces, linear independence, bases, and rank. Investigation then focuses on the algebraic properties of matrices that illuminate the geometry of the linear transformations that they represent. Determinants, eigenvalues, and eigenvectors all benefit from this geometric viewpoint. Throughout, "Extra Topic" sections augment the core content with a wide range of ideas and applications, from linear programming, to power iteration and linear recurrence relations. Exercises of all levels accompany each section, including many designed to be tackled using computer software. *Introduction to Linear and Matrix Algebra* is ideal for an introductory proof-based linear algebra course. The engaging color presentation and frequent marginal notes showcase the author's visual approach. Students are assumed to have completed one or two university-level mathematics courses, though calculus is not an explicit requirement. Instructors will appreciate the ample opportunities to choose topics that align with the needs of each classroom, and the online homework sets that are available through WeBWorK.

Linear Algebra for the Young Mathematician is a careful, thorough, and rigorous introduction to linear algebra. It adopts a conceptual point of view, focusing on the notions of vector spaces and linear transformations, and it takes pains to provide proofs that bring out the essential ideas of the subject. It begins at the beginning, assuming no prior knowledge of the subject, but goes quite far, and it includes many topics not usually treated in intro-

ductory linear algebra texts, such as Jordan canonical form and the spectral theorem. While it concentrates on the finite-dimensional case, it treats the infinite-dimensional case as well. The book illustrates the centrality of linear algebra by providing numerous examples of its application within mathematics. It contains a wide variety of both conceptual and computational exercises at all levels, from the relatively straightforward to the quite challenging. Readers of this book will not only come away with the knowledge that the results of linear algebra are true, but also with a deep understanding of why they are true.

Book Description: Gilbert Strang's textbooks have changed the entire approach to learning linear algebra -- away from abstract vector spaces to specific examples of the four fundamental subspaces: the column space and nullspace of A and A' . Introduction to Linear Algebra, Fourth Edition includes challenge problems to complement the review problems that have been highly praised in previous editions. The basic course is followed by seven applications: differential equations, engineering, graph theory, statistics, Fourier methods and the FFT, linear programming, and computer graphics. Thousands of teachers in colleges and universities and now high schools are using this book, which truly explains this crucial subject.

This comprehensive text covers both applied and theoretical branches of matrix algebra in the statistical sciences. It also provides a bridge between linear algebra and statistical models. Appropriate for advanced undergraduate and graduate students, the self-contained treatment also constitutes a handy reference for researchers. The only mathematical background necessary is

a sound knowledge of high school mathematics and a first course in statistics. Consisting of two interrelated parts, this volume begins with the basic structure of vectors and vector spaces. The latter part emphasizes the diverse properties of matrices and their associated linear transformations--and how these, in turn, depend upon results derived from linear vector spaces. An overview of introductory concepts leads to more advanced topics such as latent roots and vectors, generalized inverses, and nonnegative matrices. Each chapter concludes with a section on real-world statistical applications, plus exercises that offer concrete examples of the applications of matrix algebra.

This is an introduction to linear algebra. The main part of the book features row operations and everything is done in terms of the row reduced echelon form and specific algorithms. At the end, the more abstract notions of vector spaces and linear transformations on vector spaces are presented. However, this is intended to be a first course in linear algebra for students who are sophomores or juniors who have had a course in one variable calculus and a reasonable background in college algebra. I have given complete proofs of all the fundamental ideas, but some topics such as Markov matrices are not complete in this book but receive a plausible introduction. The book contains a complete treatment of determinants and a simple proof of the Cayley Hamilton theorem although these are optional topics. The Jordan form is presented as an appendix. I see this theorem as the beginning of more advanced topics in linear algebra and not really part of a beginning linear algebra course. There are extensions of many of the topics of this book in my on line book. I have also not emphasized that linear algebra can be carried out with any field al-

though there is an optional section on this topic, most of the book being devoted to either the real numbers or the complex numbers. It seems to me this is a reasonable specialization for a first course in linear algebra.