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A solid introduction to the methods of differential geometry and tensor calculus, this volume is suitable for advanced undergraduate and graduate students of mathematics, physics, and engineering. Rather than a comprehensive account, it offers an introduction to the essential ideas and methods of differential geometry. Part 1 begins by employing vector methods to explore the classical theory of curves and surfaces. An introduction to the differential geometry of surfaces in the large provides students with ideas and techniques involved in global research. Part 2 introduces the concept of a tensor, first in algebra, then in calculus. It covers the basic theory of the absolute calculus and the fundamentals of Riemannian geometry. Worked examples and exercises appear throughout the text. This book focuses on the unifying power of the geometrical language in bringing together concepts from many different areas of physics, ranging from classical physics to the theories describing the four fundamental interactions of Nature -- gravitational, electromagnetic, strong nuclear, and weak nuclear. The book provides in a single volume a thorough introduction to topology and differential geometry, as well as many applications to both mathematical and physical problems. It is aimed as an elementary text and is intended for first year graduate students. In addition to the traditional contents of books on special and general relativities, this book discusses also some recent advances such as de Sitter invariant special relativity, teleparallel gravity and their implications in cosmology for those wishing to reach a higher level of understanding. One of the first college-level texts for elementary courses in non-Euclidean geometry, this volumeis geared toward students familiar with calculus. Topics include the fifth postulate, hyperbolicplane geometry and trigonometry, and elliptic plane geometry and trigonometry. Extensiveappendixes offer background information on Euclidean geometry, and numerous exercisesappear throughout the text.Reprint of the Holt, Rinehart & Winston, Inc., New York, 1945 edition From the reviews: "This book offers a coherent treatment, at the graduate textbook level, of the field that has come to be known in the last decade or so as computational geometry. ... ... The book is well organized and lucidly written; a timely contribution by two founders of the field. It clearly demonstrates that computational geometry in the plane is now a fairly well-understood branch of computer science and mathematics. It also points the way to the solution of the more challenging problems in dimensions higher than two." #Mathematical Reviews#1 "... This remarkable book is a comprehensive and systematic study on research results obtained especially in the last ten years. The very clear presentation concentrates on basic ideas, fundamental combinatorial structures, and crucial algorithmic techniques. The plenty of results is clever organized following these guidelines and within the framework of some detailed case studies. A large number of figures and examples also aid the understanding of the material. Therefore, it can be highly recommended as an early graduate text but it should prove also to be essential to researchers and professionals in applied fields of computer-aided design, computer graphics, and robotics." #Biometrical Journal#2 Requiring only an understanding of differentiable manifolds, Isaac Chavel covers introductory ideas followed by a selection of more specialized topics in this second edition. He provides a clearer treatment of many topics, with new proofs of some theorems and a new chapter on the Riemannian geometry of surfaces. Among the classical topics shown in a new setting is isoperimetric inequalities in curved spaces. Completely new themes created by curvature include the classical Rauch comparison theorem and its consequences in geometry and topology, and the interaction of microscopic behavior of the geometry with the macroscopic structure of the space. Introduction to Computational Contact Mechanics: A Geometrical Approach covers the fundamentals of computational contact mechanics and focuses on its practical implementation. Part one of this textbook focuses on the underlying theory and covers essential information about differential geometry and mathematical methods which are necessary to build the computational algorithm independently from other courses in mechanics. The geometrically exact theory for the computational contact mechanics is described in step-by-step manner, using examples of strict derivation from a mathematical point of view. The final goal of the theory is to construct in the independent approximation form /so-called covariant form, including application to high-order and isogeometric finite elements. The second part of a book is a practical guide for programming of contact elements and is written in such a way that makes it easy for a programmer to implement using any programming language. All programming examples are accompanied by a set of verification examples allowing the user to learn the research verification technique, essential for the computational contact analysis. Key features: Covers the fundamentals of computational contact mechanics Covers practical programming, verification and analysis of contact problems Presents the geometrically exact theory for computational contact mechanics Describes algorithms used in well-known finite element software packages Describes modeling of forces as an inverse contact algorithm Includes practical exercises Contains unique verification examples such as the generalized Euler formula for a rope on a surface, and the impact problem and verification of thå percussion center Accompanied by a website hosting software Introduction to Computational Contact Mechanics: A Geometrical Approach is an ideal textbook for graduates and senior undergraduates, and is also a useful reference for researchers and practitioners working in computational mechanics. The content of Geometry with an Introduction to Cosmic Topology is motivated by questions that have ignited the imagination of stargazers since antiquity. What is the shape of the universe? Does the universe have and edge? Is it infinitely big? Dr. Hitchman aims to clarify this fascinating area of mathematics. This non-Euclidean geometry text is organized intothree natural parts. Chapter 1 *provides an overview including a brief history of Geometry, Surfaces, and reasons to study Non-Euclidean Geometry. Chapters 2-7 contain the core mathematical content of the text, following the ErlangenProgram, which develops geometry in terms of a space and a group of transformations on that space. Finally chapters 1 and 8 introduce (chapter 1) and explore (chapter 8) the topic of cosmic topology through the geometry learned in the preceding chapters. The aim of this book is to introduce the reader to the geometric theory of algebraic varieties, in particular to the birational geometry of algebraic varieties. This volume grew out of the author's book in Japanese published in 3 volumes by Iwanami, Tokyo, in 1977. While writing this English version, the author has tried to rearrange and rewrite the original material so that even beginners can read it easily without referring to other books, such as textbooks on commutative algebra. The reader is only expected to know the definition of Noetherin rings and the statement of the Hilbert basis theorem. The new chapters 1, 2, and 10 have been expanded. In particular, the exposition of D-dimension theory, although shorter, is more complete than in the old version. However, to keep the book of manageable size, the latter parts of Chapters 6, 9, and 11 have been removed. I thank Mr. A. Sevenster for encouraging me to write this new version, and Professors K. K. Kubota in Kentucky and P. M. H. Wilson in Cam bridge for their careful and critical reading of the English manuscripts and typescripts. I held seminars based on the material in this book at The University of Tokyo, where a large number of valuable comments and suggestions were given by students Iwamiya, Kawamata, Norimatsu, Tobita, Tsushima, Maeda, Sakamoto, Tsunoda, Chou, Fujiwara, Suzuki, and Matsuda. Fluid Mechanics: A Geometrical Point of View emphasizes general principles of physics illustrated by simple examples in fluid mechanics. Advanced mathematics (e.g., Riemannian geometry and Lie groups) commonly used in other parts of theoretical physics (e.g. General Relativity or High Energy Physics) are explained and applied to fluid mechanics. This follows on from the author's book Advanced Mechanics (Oxford University Press, 2013). After introducing the fundamental equations (Euler and Navier-Stokes), the book provides particular cases: ideal and viscous flows, shocks, boundary layers, instabilities, and transients. A restrained look at integrable systems (KdV) leads into a formulation of an ideal fluid as a hamiltonian system. Arnold's deep idea, that the instability of a fluid can be understood using the curvature of the diffeomorphism group, will be explained. Leray's work on regularity of Navier-Stokes solutions, and the modern developments arising from it, will be explained in language for physicists. Although this is a book on theoretical physics, readers will learn basic numerical methods: spectral and finite difference methods, geometric integrators for ordinary differential equations. Readers will take a deep dive into chaotic dynamics, using the Smale horse shoe as an example. Aref's work on chaotic advection is explained. The book concludes with a self-contained introduction to renormalization, an idea from high energy physics which is expected to be useful in developing a theory of turbulence. 'Gravity, a Geometrical Course' presents general relativity (GR) in a systematic and exhaustive way, covering three aspects that are homogenized into a single texture: i) the mathematical, geometrical foundations, exposed in a self consistent contemporary formalism, ii) the main physical, astrophysical and cosmological applications, updated to the issues of contemporary research and observations, with glimpses on supergravity and superstring theory, iii) the historical development of scientific ideas underlying both the birth of general relativity and its subsequent evolution. The book, divided in two volumes, is a rich resource for graduate students and those who wish to gain a deep knowledge of the subject without an instructor. Volume One is dedicated to the development of the theory and basic physical applications. It guides the reader from the foundation of special relativity to Einstein field equations, illustrating some basic applications in astrophysics. A detailed account of the historical and conceptual development of the theory is combined with the presentation of its mathematical foundations. Differentiable manifolds, fibre-bundles, differential forms, and the theory of connections are covered, with a sketchy introduction to homology and cohomology. (Pseudo)-Riemannian geometry is presented both in the metric and in the vielbein approach. Physical applications include the motions in a Schwarzschild field leading to the classical tests of GR (light-ray bending and periastron advance) discussion of relativistic stellar equilibrium, white dwarfs, Chandrasekhar mass limit and polytropes. An entire chapter is devoted to tests of GR and to the indirect evidence of gravitational wave emission. The formal structure of gravitational theory is at all stages compared with that of non gravitational gauge theories, as a preparation to its modern extension, namely supergravity, discussed in the second volume. Pietro Frè is Professor of Theoretical Physics at the University of Torino, Italy and is currently serving as Scientific Counsellor of the Italian Embassy in Moscow. His scientific passion lies in supergravity and all allied topics, since the inception of the field, in 1976. He was professor at SISSA, worked in the USA and at CERN. He has taught General Relativity for 15 years. He has previously two scientific monographs, "Supergravity and Superstrings" and "The N=2 Wonderland", He is also the author of a popular science book on cosmology and two novels, in Italian. The differential geometry of curves and surfaces in Euclidean space has fascinated mathematicians since the time of Newton. Here the authors take a novel approach by casting the theory into a new light, that of singularity theory. The second edition of this successful textbook has been thoroughly revised throughout and includes a multitude of new exercises and examples. A new final chapter has been added that covers recently developed techniques in the classification of functions of several variables, a subject central to many applications of singularity theory. Also in this second edition are new sections on the Morse lemma and the classification of plane curve singularities. The only prerequisites for students to follow this textbook are a familiarity with linear algebra and advanced calculus. Thus it will be invaluable for anyone who would like an introduction to the modern theories of catastrophes and singularities. Sheaves arose in geometry as coefficients for cohomology and as descriptions of the functions appropriate to various kinds of manifolds. Sheaves also appear in logic as carriers for models* *of set theory. This text presents topos theory as it has developed from the study of sheaves. Beginning with several examples, it explains the underlying ideas of topology and sheaf theory as well as the general theory of elementary toposes and geometric morphisms and their relation to logic. Edmund Husserl's Origin of Geometry": An Introduction (1962) is Jacques Derrida's earliest published work. In this commentary-interpretation of the famous appendix to Husserl's The Crisis of European Sciences and Transcendental Phenomenology, Derrida relates writing to such key concepts as differing, consciousness, presence, and historicity. Starting from Husserl's method of historical investigation, Derrida gradually unravels a deconstructive critique of phenomenology itself, which forms the foundation for his later criticism of Western metaphysics as a metaphysics of presence. The complete text of Husserl's Origin of Geometry is included. This lucid and accessible text provides an introductory guide to projective geometry, an area of mathematics concerned with the properties and invariants of geometric figures under projection. Including numerous worked examples and exercises throughout, the book covers axiomatic geometry, field planes and PG(r, F), coordinating a projective plane, non-Desarguesian planes, conics and quadrics in PG(3, F). Assuming familiarity with linear algebra, elementary group theory, partial differentiation and finite fields, as well as some elementary coordinate geometry, this text is ideal for 3rd and 4th year mathematics undergraduates. Geared toward readers unfamiliar with complex numbers, this text explains how to solve problems that frequently arise in the applied sciences and emphasizes constructions related to algebraic operations. 1956 edition. 'Gravity, a Geometrical Course' presents general relativity (GR) in a systematic and exhaustive way, covering three aspects that are homogenized into a single texture: i) the mathematical, geometrical foundations, exposed in a self consistent contemporary formalism, ii) the main physical, astrophysical and cosmological applications, updated to the issues of contemporary research and observations, with glimpses on supergravity and superstring theory, iii) the historical development of scientific ideas underlying both the birth of general relativity and its subsequent evolution. The book is divided in two volumes. Volume Two is covers black holes, cosmology and an introduction to supergravity. The aim of this volume is two-fold. It completes the presentation of GR and it introduces the reader to theory of gravitation beyond GR, which is supergravity. Starting with a short history of the black hole concept, the book covers the Kruskal extension of the Schwarzschild metric, the causal structures of Lorentzian manifolds, Penrose diagrams and a detailed analysis of the Kerr-Newman metric. An extensive historical account of the development of modern cosmology is followed by a detailed presentation of its mathematical structure, including non-isotropic cosmologies and billiards, de Sitter space and inflationary scenarios, perturbation theory and anisotropies of the Cosmic Microwave Background. The last three chapters deal with the mathematical and conceptual foundations of supergravity in the frame of free differential algebras. Branes are presented both as classical solutions of the bulk theory and as world-volume gauge theories with particular emphasis on the geometrical interpretation of kappa-supersymmetry. The rich bestiary of special geometries underlying supergravity lagrangians is presented, followed by a chapter providing glances on the equally rich collection of special solutions of supergravity. Pietro Frè is Professor of Theoretical Physics at the University of Torino, Italy and is currently serving as Scientific Counsellor of the Italian Embassy in Moscow. His scientific passion lies in supergravity and all allied topics, since the inception of the field, in 1976. He was professor at SISSA, worked in the USA and at CERN. He has taught General Relativity for 15 years. He has previously two scientific monographs, "Supergravity and Superstrings" and "The N=2 Wonderland", He is also the author of a popular science book on cosmology and two novels, in Italian. Classic exploration of topics of perennial interest to geometers: fundamental ideas of incidence, parallelism, perpendicularity, angles between linear spaces, polytopes. Examines analytical geometry from projective and analytic points of view. 1929 edition. This book provides a working knowledge of those parts of exterior differential forms, differential geometry, algebraic and differential topology, Lie groups, vector bundles and Chern forms that are essential for a deeper understanding of both classical and modern physics and engineering. Included are discussions of analytical and fluid dynamics, electromagnetism (in flat and curved space), thermodynamics, the deformation tensors of elasticity, soap films, special and general relativity, the Dirac operator and spinors, and gauge fields, including Yang-Mills, the Aharonov-Bohm effect, Berry phase, and instanton winding numbers, quarks, and quark model for mesons. Before discussing abstract notions of differential geometry, geometric intuition is developed through a rather extensive introduction to the study of surfaces in ordinary space; consequently, the book should be of interest also to mathematics students. Ideal for graduate and advanced undergraduate students of physics, engineering and mathematics as a course text or for self study. Geometry Illuminated is an introduction to geometry in the plane, both Euclidean and hyperbolic. It is designed to be used in an undergraduate course on geometry, and as such, its target audience is undergraduate math majors. However, much of it should be readable by anyone who is comfortable with the language of mathematical proof. Throughout, the goal is to develop the material patiently. One of the more appealing aspects of geometry is that it is a very "visual" subject. This book hopes to takes full advantage of that, with an extensive use of illustrations as guides. Geometry Illuminated is divided into four principal parts. Part 1 develops neutral geometry in the style of Hilbert, including a discussion of the construction of measure in that system, ultimately building up to the Saccheri-Legendre Theorem. Part 2 provides a glimpse of classical Euclidean geometry, with an emphasis on concurrence results, such as the nine-point circle. Part 3 studies transformations of the Euclidean plane, beginning with isometries and ending with inversion, with applications and a discussion of area in between. Part 4 is dedicated to the development of the Poincaré disk model, and the study of geometry within that model. While this material is traditional, Geometry Illuminated does bring together topics that are generally not found in a book at this level. Most notably, it explicitly computes parametric equations* *for the pseudosphere and its geodesics. It focuses less on the nature of axiomatic systems for geometry, but emphasizes rather the logical development of geometry within such a system. It also includes sections dealing with trilinear and barycentric coordinates, theorems that can be proved using inversion, and Euclidean and hyperbolic tilings. An easily accessible introduction to over three centuries of innovations in geometry Praise for the First Edition ". . . a welcome alternative to compartmentalized treatments bound to the old thinking. This clearly written, well-illustrated book supplies sufficient background to be self-contained." —CHOICE This fully revised new edition offers the most comprehensive coverage of modern geometry currently available at an introductory level. The book strikes a welcome balance between academic rigor and accessibility, providing a complete and cohesive picture of the science with an unparalleled range of topics. Illustrating modern mathematical topics, Introduction to Topology and Geometry, Second Edition discusses introductory topology, algebraic topology, knot theory, the geometry of surfaces, Riemann geometries, fundamental groups, and differential geometry, which opens the doors to a wealth of applications. With its logical, yet flexible, organization, the Second Edition: • Explores historical notes interspersed throughout the exposition to provide readers with a feel for how the mathematical disciplines and theorems came into being • Provides exercises ranging from routine to challenging, allowing readers at varying levels of study to master the concepts and methods • Bridges seemingly disparate topics by creating thoughtful and logical connections • Contains coverage on the elements of polytope theory, which acquaints readers with an exposition of modern theory Introduction to Topology and Geometry, Second Edition is an excellent introductory text for topology and geometry courses at the upper-undergraduate level. In addition, the book serves as an ideal reference for professionals interested in gaining a deeper understanding of the topic. An accessible introductory textbook on general relativity, covering the theory's foundations, mathematical formalism and major applications. This book is intended to be an introduction to Diophantine geometry. The central theme of the book is to investigate the distribution of integral points on algebraic varieties. This text rapidly introduces problems in Diophantine geometry, especially those involving integral points, assuming a geometrical perspective. It presents recent results not available in textbooks and also new viewpoints on classical material. In some instances, proofs have been replaced by a detailed analysis of particular cases, referring to the quoted papers for complete proofs. A central role is played by Siegel's finiteness theorem for integral points on curves. The book ends with the analysis of integral points on surfaces. Translated into many languages, this book was in continuous use as the standard university-level text for a quarter-century, until it was revised and enlarged by the author in 1952. World-renowned writer and researcher Nathan Altshiller-Court (1881–1968) was a professor of mathematics at the University of Oklahoma for more than thirty years. His revised introduction to modern geometry offers today's students the benefits of his many years of teaching experience. The first part of the text stresses construction problems, proceeding to surveys of similitude and homothecy, properties of the triangle and the quadrilateral, and harmonic division. Subsequent chapters explore the geometry of the circle — including inverse points, orthogonals, coaxals, and the problem of Apollonius and triangle geometry, focusing on Lemoine and Brocard geometry, isogonal lines, Tucker circles, and the orthopole. Numerous exercises of varying degrees of difficulty appear throughout the text. Inspired by classical geometry, geometric group theory has in turn provided a variety of applications to geometry, topology, group theory, number theory and graph theory. This carefully written textbook provides a rigorous introduction to this rapidly evolving field whose methods have proven to be powerful tools in neighbouring fields such as geometric topology. Geometric group theory is the study of finitely generated groups via the geometry of their associated Cayley graphs. It turns out that the essence of the geometry of such groups is captured in the key notion of quasi-isometry, a large-scale version of isometry whose invariants include growth types, curvature conditions, boundary constructions, and amenability. This book covers the foundations of quasi-geometry of groups at an advanced undergraduate level. The subject is illustrated by many elementary examples, outlooks on applications, as well as an extensive collection of exercises. This is the only text that introduces differential geometry by combining the following: an intuitive geometric foundation, a rigorous connection with the standard formalisms, computer exercises with Maple, and a problems-based approach. Has running theme on the intrinsic/extrinsic view of curves and surfaces. *Uses basic intuitive geometry as a starting point which makes the material more accessible and the formalism more meaningful. *Topics are based on and introduced through 55 core problems. *The ribbon test for geometrically finding geodesics is introduced in Chapter 1. Then it is proven that it works in Chapter 3. Finally, using ruled surfaces in Chapter 7, it is proven that almost all geodesics can be found this way. *Introduces hyperbolic geometry in the first chapter. *Supports an intuitive grasp of concepts. *Includes 19 computer projects for use with Maple. *An Instructor's Manual with complete solutions for each problem is available. Leading experts present a unique, invaluable introduction to the study of the geometry and typology of fluid flows. From basic motions on curves and surfaces to the recent developments in knots and links, the reader is gradually led to explore the fascinating world of geometric and topological fluid mechanics. Geodesics and chaotic orbits, magnetic knots and vortex links, continual flows and singularities become alive with more than 160 figures and examples. In the opening article, H. K. Moffatt sets the pace, proposing eight outstanding problems for the 21st century. The book goes on to provide concepts and techniques for tackling these and many other interesting open problems. Author Serge Lang defines algebraic geometry as the study of systems of algebraic equations in several variables and of the structure that one can give to the solutions of such equations. The study can be carried out in four ways: analytical, topological, algebraico-geometric, and arithmetic. This volume offers a rapid, concise, and self-contained introductory approach to the algebraic aspects of the third method, the algebraico-geometric. The treatment assumes only* *familiarity with elementary algebra up to the level of Galois theory. Starting with an opening chapter on the general theory of places, the author advances to examinations of algebraic varieties, the absolute theory of varieties, and products, projections, and correspondences. Subsequent chapters explore normal varieties, divisors and linear systems, differential forms, the theory of simple points, and algebraic groups, concluding with a focus on the Riemann-Roch theorem. All the theorems of a general nature related to the foundations of the theory of algebraic groups are featured. The goal of this book is to provide an introduction to algebraic geometry accessible to students. Starting from solutions of polynomial equations, modern tools of the subject soon appear, motivated by how they improve our understanding of geometrical concepts. In many places, analogies and differences with related mathematical areas are explained. The text approaches foundations of algebraic geometry in a complete and self-contained way, also covering the underlying algebra. The last two chapters include a comprehensive treatment of cohomology and discuss some of its applications in algebraic geometry. This textbook is suitable for a one semester lecture course on differential geometry for students of mathematics or STEM disciplines with a working knowledge of analysis, linear algebra, complex analysis, and point set topology. The book treats the subject both from an extrinsic and an intrinsic view point. The first chapters give a historical overview of the field and contain an introduction to basic concepts such as manifolds and smooth maps, vector fields and flows, and Lie groups, leading up to the theorem of Frobenius. Subsequent chapters deal with the Levi-Civita connection, geodesics, the Riemann curvature tensor, a proof of the Cartan-Ambrose-Hicks theorem, as well as applications to flat spaces, symmetric spaces, and constant curvature manifolds. Also included are sections about manifolds with nonpositive sectional curvature, the Ricci tensor, the scalar curvature, and the Weyl tensor. An additional chapter goes beyond the scope of a one semester lecture course and deals with subjects such as conjugate points and the Morse index, the injectivity radius, the group of isometries and the Myers-Steenrod theorem, and Donaldson's differential geometric approach to Lie algebra theory. The study of geometry is at least 2500 years old, and it is within this field that the concept of mathematical proof - deductive reasoning from a set of axioms - first arose. To this day geometry remains a very active area of research in mathematics.This Very Short Introduction covers the areas of mathematics falling under geometry, starting with topics such as Euclidean and non-Euclidean geometries, and ranging to curved spaces, projective geometry in Renaissance art, and geometry of space-time inside a black hole. Starting from the basics,Maciej Dunajski proceeds from concrete examples (of mathematical objects like Platonic solids, or theorems like the Pythagorean theorem) to general principles. Throughout, he outlines the role geometry plays in the broader context of science and art.Very Short Introductions: Brilliant, Sharp, InspiringABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, andenthusiasm to make interesting and challenging topics highly readable. Book 3 in the Princeton Mathematical Series. Originally published in 1950. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905. This friendly introduction helps undergraduate students understand and appreciate matroid theory and its connections to geometry. This book provides an introduction to the differential geometry of curves and surfaces in three-dimensional Euclidean space and to n-dimensional Riemannian geometry. Based on Kreyszig's earlier book Differential Geometry, it is presented in a simple and understandable manner with many examples illustrating the ideas, methods, and results. Among the topics covered are vector and tensor algebra, the theory of surfaces, the formulae of Weingarten and Gauss, geodesics, mappings of surfaces and their applications, and global problems. A thorough investigation of Reimannian manifolds is made, including the theory of hypersurfaces. Interesting problems are provided and complete solutions are given at the end of the book together with a list of the more important formulae. Elementary calculus is the sole prerequisite for the understanding of this detailed and complete study in mathematics. Transformation Geometry: An Introduction to Symmetry offers a modern approach to Euclidean Geometry. This study of the automorphism groups of the plane and space gives the classical concrete examples that serve as a meaningful preparation for the standard undergraduate course in abstract algebra. The detailed development of the isometries of the plane is based on only the most elementary geometry and is appropriate for graduate courses for secondary teachers. From the reviews: "A well-written, very thorough account ... Among the topics are lattices, reduction, Minkowskis Theorem, distance functions, packings, and automorphs; some applications to number theory; excellent bibliographical references." The American Mathematical Monthly*

- [Curves And Singularities]()

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