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KEY=INTRODUCTION - RODERICK ALICE

Introduction to the Geometry of Complex Numbers

Courier Corporation *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.*

Complex Geometry

An Introduction

Springer Science & Business Media *Easily accessible Includes recent developments Assumes very little knowledge of differentiable manifolds and functional analysis Particular emphasis on topics related to mirror symmetry (SUSY, Kaehler-Einstein metrics, Tian-Todorov lemma)*

Introduction to Complex Analytic Geometry

Birkhäuser *facts. An elementary acquaintance with topology, algebra, and analysis (in cluding the notion of a manifold) is sufficient as far as the understanding of this book is concerned. All the necessary properties and theorems have been gathered in the preliminary chapters -either with proofs or with references to standard and elementary textbooks. The first chapter of the book is devoted to a study of the rings*

Oa of holomorphic functions. The notions of analytic sets and germs are introduced in the second chapter. Its aim is to present elementary properties of these objects, also in connection with ideals of the rings Oa. The case of principal germs (§5) and one-dimensional germs (Puiseux theorem, §6) are treated separately. The main step towards understanding of the local structure of analytic sets is Ruckert's descriptive lemma proved in Chapter III. Among its conse quences is the important Hilbert Nullstellensatz (§4). In the fourth chapter, a study of local structure (normal triples, § 1) is followed by an exposition of the basic properties of analytic sets. The latter includes theorems on the set of singular points, irreducibility, and decom position into irreducible branches (§2). The role played by the ring 0 A of an analytic germ is shown (§4). Then, the Remmert-Stein theorem on re movable singularities is proved (§6). The last part of the chapter deals with analytically constructible sets (§7).

An Introduction to Complex Analysis and Geometry

American Mathematical Soc. *An Introduction to Complex Analysis and Geometry provides the reader with a deep appreciation of complex analysis and how this subject fits into mathematics. The book developed from courses given in the Campus Honors Program at the University of Illinois Urbana-Champaign. These courses aimed to share with students the way many mathematics and physics problems magically simplify when viewed from the perspective of complex analysis. The book begins at an elementary level but also contains advanced material. The first four chapters provide an introduction to complex analysis with many elementary and unusual applications. Chapters 5 through 7 develop the Cauchy theory and include some striking applications to calculus. Chapter 8 glimpses several appealing topics, simultaneously unifying the book and opening the door to further study. The 280 exercises range from simple computations to difficult problems. Their variety makes the book especially attractive. A reader of the first four chapters will be able to apply complex numbers in many elementary contexts. A reader of the full book will know basic one complex variable theory and will have seen it integrated into mathematics as a whole. Research mathematicians will discover several novel perspectives.*

Geometry of Complex Numbers

Courier Corporation *Illuminating, widely praised book on analytic geometry of circles, the Moebius transformation, and 2-dimensional non-Euclidean geometries.*

Introduction to Complex Analytic Geometry

Birkhäuser *facts. An elementary acquaintance with topology, algebra, and analysis (in cluding the notion of a manifold) is sufficient as far as the understanding of this book is concerned. All the necessary properties and theorems have been gathered in*

the preliminary chapters -either with proofs or with references to standard and elementary textbooks. The first chapter of the book is devoted to a study of the rings Oa of holomorphic functions. The notions of analytic sets and germs are introduced in the second chapter. Its aim is to present elementary properties of these objects, also in connection with ideals of the rings Oa. The case of principal germs (§5) and one-dimensional germs (Puiseux theorem, §6) are treated separately. The main step towards understanding of the local structure of analytic sets is Ruckert's descriptive lemma proved in Chapter III. Among its conse quences is the important Hilbert Nullstellensatz (§4). In the fourth chapter, a study of local structure (normal triples, § 1) is followed by an exposition of the basic properties of analytic sets. The latter includes theorems on the set of singular points, irreducibility, and decom position into irreducible branches (§2). The role played by the ring 0 A of an analytic germ is shown (§4). Then, the Remmert-Stein theorem on re movable singularities is proved (§6). The last part of the chapter deals with analytically constructible sets (§7).

Complex Numbers and Geometry

Cambridge University Press *The purpose of this book is to demonstrate that complex numbers and geometry can be blended together beautifully. This results in easy proofs and natural generalizations of many theorems in plane geometry, such as the Napoleon theorem, the Ptolemy-Euler theorem, the Simson theorem, and the Morley theorem. The book is self-contained - no background in complex numbers is assumed - and can be covered at a leisurely pace in a one-semester course. Many of the chapters can be read independently. Over 100 exercises are included. The book would be suitable as a text for a geometry course, or for a problem solving seminar, or as enrichment for the student who wants to know more.*

Introduction to Lipschitz Geometry of Singularities

Lecture Notes of the International School on Singularity Theory and Lipschitz Geometry, Cuernavaca, June 2018

Springer Nature *This book presents a broad overview of the important recent progress which led to the emergence of new ideas in Lipschitz geometry and singularities, and started to build bridges to several major areas of singularity theory. Providing all the necessary background in a series of introductory lectures, it also contains Pham and Teissier's previously unpublished pioneering work on the*

Lipschitz classification of germs of plane complex algebraic curves. While a real or complex algebraic variety is topologically locally conical, it is in general not metrically conical; there are parts of its link with non-trivial topology which shrink faster than linearly when approaching the special point. The essence of the Lipschitz geometry of singularities is captured by the problem of building classifications of the germs up to local bi-Lipschitz homeomorphism. The Lipschitz geometry of a singular space germ is then its equivalence class in this category. The book is aimed at graduate students and researchers from other fields of geometry who are interested in studying the multiple open questions offered by this new subject.

Algebraic Geometry over the Complex Numbers

Springer Science & Business Media *This is a relatively fast paced graduate level introduction to complex algebraic geometry, from the basics to the frontier of the subject. It covers sheaf theory, cohomology, some Hodge theory, as well as some of the more algebraic aspects of algebraic geometry. The author frequently refers the reader if the treatment of a certain topic is readily available elsewhere but goes into considerable detail on topics for which his treatment puts a twist or a more transparent viewpoint. His cases of exploration and are chosen very carefully and deliberately. The textbook achieves its purpose of taking new students of complex algebraic geometry through this a deep yet broad introduction to a vast subject, eventually bringing them to the forefront of the topic via a non-intimidating style.*

Introduction to Complex Analytic Geometry

Birkhauser

Gauge Field Theory and Complex Geometry

Springer Science & Business Media *From the reviews: "... focused mainly on complex differential geometry and holomorphic bundle theory. This is a powerful book, written by a very distinguished contributor to the field" (Contemporary Physics)"the book provides a large amount of background for current research across a spectrum of field. ... requires effort to read but it is worthwhile and rewarding" (New Zealand Math. Soc. Newsletter) " The contents are highly technical and the pace of the exposition is quite fast. Manin is an outstanding mathematician, and writer as well, perfectly at ease in the most abstract and complex situation. With such a guide the reader will be generously rewarded!" (Physicalia) This new edition includes an Appendix on developments of the last 10 years, by S. Merkulov.*

Representation Theory and Complex Geometry

Birkhauser *This volume provides an overview of modern advances in representation theory from a geometric standpoint. The techniques developed are quite general and can be applied to other areas such as quantum groups, affine Lie groups, and quantum field theory.*

Analysis and Geometry on Complex Homogeneous Domains

Springer Science & Business Media *A number of important topics in complex analysis and geometry are covered in this excellent introductory text. Written by experts in the subject, each chapter unfolds from the basics to the more complex. The exposition is rapid-paced and efficient, without compromising proofs and examples that enable the reader to grasp the essentials. The most basic type of domain examined is the bounded symmetric domain, originally described and classified by Cartan and Harish- Chandra. Two of the five parts of the text deal with these domains: one introduces the subject through the theory of semisimple Lie algebras (Koranyi), and the other through Jordan algebras and triple systems (Roos). Larger classes of domains and spaces are furnished by the pseudo-Hermitian symmetric spaces and related R-spaces. These classes are covered via a study of their geometry and a presentation and classification of their Lie algebraic theory (Kaneyuki). In the fourth part of the book, the heat kernels of the symmetric spaces belonging to the classical Lie groups are determined (Lu). Explicit computations are made for each case, giving precise results and complementing the more abstract and general methods presented. Also explored are recent developments in the field, in particular, the study of complex semigroups which generalize complex tube domains and function spaces on them (Faraut). This volume will be useful as a graduate text for students of Lie group theory with connections to complex analysis, or as a self-study resource for newcomers to the field. Readers will reach the frontiers of the subject in a considerably shorter time than with existing texts.*

Riemann Surfaces by Way of Complex Analytic Geometry

American Mathematical Soc. *This book establishes the basic function theory and complex geometry of Riemann surfaces, both open and compact. Many of the methods used in the book are adaptations and simplifications of methods from the theories of several complex variables and complex analytic geometry and would serve as excellent training for mathematicians wanting to work in complex analytic*

geometry. After three introductory chapters, the book embarks on its central, and certainly most novel, goal of studying Hermitian holomorphic line bundles and their sections. Among other things, finite-dimensionality of spaces of sections of holomorphic line bundles of compact Riemann surfaces and the triviality of holomorphic line bundles over Riemann surfaces are proved, with various applications. Perhaps the main result of the book is Hormander's Theorem on the square-integrable solution of the Cauchy-Riemann equations. The crowning application is the proof of the Kodaira and Narasimhan Embedding Theorems for compact and open Riemann surfaces. The intended reader has had first courses in real and complex analysis, as well as advanced calculus and basic differential topology (though the latter subject is not crucial). As such, the book should appeal to a broad portion of the mathematical and scientific community. This book is the first to give a textbook exposition of Riemann surface theory from the viewpoint of positive Hermitian line bundles and Hormander $\bar \partial$ estimates. It is more analytical and PDE oriented than prior texts in the field, and is an excellent introduction to the methods used currently in complex geometry, as exemplified in J. P. Demailly's online but otherwise unpublished book ``Complex analytic and differential geometry.'' I used it for a one quarter course on Riemann surfaces and found it to be clearly written and self-contained. It not only fills a significant gap in the large textbook literature on Riemann surfaces but is also rather indispensible for those who would like to teach the subject from a differential geometric and PDE viewpoint. --Steven Zelditch

From Holomorphic Functions to Complex Manifolds

Springer Science & Business Media *This introduction to the theory of complex manifolds covers the most important branches and methods in complex analysis of several variables while completely avoiding abstract concepts involving sheaves, coherence, and higher-dimensional cohomology. Only elementary methods such as power series, holomorphic vector bundles, and one-dimensional cocycles are used. Each chapter contains a variety of examples and exercises.*

Perspectives on Projective Geometry

A Guided Tour Through Real and Complex Geometry

Springer Science & Business Media *Projective geometry is one of the most fundamental and at the same time most beautiful branches of geometry. It can be*

considered the common foundation of many other geometric disciplines like Euclidean geometry, hyperbolic and elliptic geometry or even relativistic space-time geometry. This book offers a comprehensive introduction to this fascinating field and its applications. In particular, it explains how metric concepts may be best understood in projective terms. One of the major themes that appears throughout this book is the beauty of the interplay between geometry, algebra and combinatorics. This book can especially be used as a guide that explains how geometric objects and operations may be most elegantly expressed in algebraic terms, making it a valuable resource for mathematicians, as well as for computer scientists and physicists. The book is based on the author's experience in implementing geometric software and includes hundreds of high-quality illustrations.

Hodge Theory and Complex Algebraic Geometry I:

Cambridge University Press *This is a modern introduction to Kaehlerian geometry and Hodge structure. Coverage begins with variables, complex manifolds, holomorphic vector bundles, sheaves and cohomology theory (with the latter being treated in a more theoretical way than is usual in geometry). The book culminates with the Hodge decomposition theorem. In between, the author proves the Kaehler identities, which leads to the hard Lefschetz theorem and the Hodge index theorem. The second part of the book investigates the meaning of these results in several directions.*

An Introduction to Complex Analysis and Geometry

An Introduction to Complex Analysis and GeometryBy John P. D'Angelo

Basic Algebraic Geometry 2 Schemes and Complex Manifolds

Springer *The second volume of Shafarevich's introductory book on algebraic geometry focuses on schemes, complex algebraic varieties and complex manifolds. As with first volume the author has revised the text and added new material. Although the material is more advanced than in Volume 1 the algebraic apparatus is kept to a minimum making the book accessible to non-specialists. It can be read independently of the first volume and is suitable for beginning graduate students.*

Geometry with an Introduction to Cosmic Topology

Jones & Bartlett Learning *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.*

Complex Hyperbolic Geometry

Oxford University Press *The geometry of complex hyperbolic space has not, so far, been given a comprehensive treatment in the literature. This book seeks to address this by providing an overview of this particularly rich area of research, and is largely motivated by the wide applications in other areas of mathematics and physics.*

Complex Analysis and Algebraic Geometry

A Collection of Papers Dedicated to K. Kodaira

CUP Archive *The articles in this volume cover some developments in complex analysis and algebraic geometry. The book is divided into three parts. Part I includes topics in the theory of algebraic surfaces and analytic surface. Part II covers topics in moduli and classification problems, as well as structure theory of certain complex manifolds. Part III is devoted to various topics in algebraic geometry analysis and arithmetic. A survey article by Ueno serves as an introduction to the general background of the subject matter of the volume. The volume was written for Kunihiko Kodaira on the occasion of his sixtieth birthday, by his friends and students. Professor Kodaira was one of the world's leading mathematicians in algebraic geometry and complex manifold theory: and the contributions reflect those concerns.*

Introduction to the Geometry of Complex Numbers

Courier Corporation *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.*

Complex Numbers from A to ...Z

Springer Science & Business Media * *Learn how complex numbers may be used to solve algebraic equations, as well as their geometric interpretation * Theoretical aspects are augmented with rich exercises and problems at various levels of difficulty * A special feature is a selection of outstanding Olympiad problems solved by employing the methods presented * May serve as an engaging supplemental text for an introductory undergrad course on complex numbers or number theory*

Geometry of Complex Numbers

Circle Geometry, Moebius Transformation, Non-euclidean Geometry

Courier Corporation *Illuminating, widely praised book on analytic geometry of circles, the Moebius transformation, and 2-dimensional non-Euclidean geometries. "This book should be in every library, and every expert in classical function theory should be familiar with this material. The author has performed a distinct service by making this material so conveniently accessible in a single book." — Mathematical Review.*

Introduction À la Géométrie Des Nombres Complexes. Introduction to the Geometry of Complex Numbers ... Translated from the

Revised Edition by Howard Eves

Introduction to the Geometry of Complex Numbers

Hassell Street Press *This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. To ensure a quality reading experience, this work has been proofread and republished using a format that seamlessly blends the original graphical elements with text in an easy-to-read typeface. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant.*

Fractal Geometry, Complex Dimensions and Zeta Functions

Geometry and Spectra of Fractal Strings

Springer Science & Business Media *Number theory, spectral geometry, and fractal geometry are interlinked in this in-depth study of the vibrations of fractal strings, that is, one-dimensional drums with fractal boundary. Throughout Geometry, Complex Dimensions and Zeta Functions, Second Edition, new results are examined and a new definition of fractality as the presence of nonreal complex dimensions with positive real parts is presented. The new final chapter discusses several new topics and results obtained since the publication of the first edition.*

Complex Projective Geometry

Selected Papers

Cambridge University Press *A volume of papers describing new methods in algebraic geometry.*

Representation Theory and Complex Geometry

Springer Science & Business Media "*The book is largely self-contained...There is a nice introduction to symplectic geometry and a charming exposition of equivariant K-theory. Both are enlivened by examples related to groups...An attractive feature is the attempt to convey some informal 'wisdom' rather than only the precise definitions. As a number of results [are] due to the authors, one finds some of the original excitement. This is the only available introduction to geometric representation theory...it has already proved successful in introducing a new generation to the subject.*" *(Bulletin of the AMS)*

Introduction to Generalized Complex Geometry

Algebra & Geometry

An Introduction to University Mathematics

CRC Press *Algebra & Geometry: An Introduction to University Mathematics provides a bridge between high school and undergraduate mathematics courses on algebra and geometry. The author shows students how mathematics is more than a collection of methods by presenting important ideas and their historical origins throughout the text. He incorporates a hands-on approach to proofs and connects algebra and geometry to various applications. The text focuses on linear equations, polynomial equations, and quadratic forms. The first several chapters cover foundational topics, including the importance of proofs and properties commonly encountered when studying algebra. The remaining chapters form the mathematical core of the book. These chapters explain the solution of different kinds of algebraic equations, the nature of the solutions, and the interplay between geometry and algebra*

Visual Complex Analysis

Oxford University Press *This radical approach to complex analysis replaces the standard calculational arguments with new geometric ones. Using several hundred diagrams this is a new visual approach to the topic.*

Introduction to Geometry and Topology

Birkhäuser *This book provides an introduction to topology, differential topology, and differential geometry. It is based on manuscripts refined through use in a variety of lecture courses. The first chapter covers elementary results and concepts from point-set topology. An exception is the Jordan Curve Theorem, which is proved for polygonal paths and is intended to give students a first glimpse into the nature of deeper topological problems. The second chapter of the book introduces manifolds and Lie groups, and examines a wide assortment of examples. Further discussion explores tangent bundles, vector bundles, differentials, vector fields, and Lie brackets of vector fields. This discussion is deepened and expanded in the third chapter, which introduces the de Rham cohomology and the oriented integral and gives proofs of the Brouwer Fixed-Point Theorem, the Jordan-Brouwer Separation Theorem, and Stokes's integral formula. The fourth and final chapter is devoted to the fundamentals of differential geometry and traces the development of ideas from curves to submanifolds of Euclidean spaces. Along the way, the book discusses connections and curvature--the central concepts of differential geometry. The discussion culminates with the Gauß equations and the version of Gauß's theorema egregium for submanifolds of arbitrary dimension and codimension. This book is primarily aimed at advanced undergraduates in mathematics and physics and is intended as the template for a one- or two-semester bachelor's course.*

Introduction to Tropical Geometry

American Mathematical Society *Tropical geometry is a combinatorial shadow of algebraic geometry, offering new polyhedral tools to compute invariants of algebraic varieties. It is based on tropical algebra, where the sum of two numbers is their minimum and the product is their sum. This turns polynomials into piecewise-linear functions, and their zero sets into polyhedral complexes. These tropical varieties retain a surprising amount of information about their classical counterparts. Tropical geometry is a young subject that has undergone a rapid development since the beginning of the 21st century. While establishing itself as an area in its own right, deep connections have been made to many branches of pure and applied mathematics. This book offers a self-contained introduction to tropical geometry, suitable as a course text for beginning graduate students. Proofs are provided for the main results, such as the Fundamental Theorem and the Structure Theorem. Numerous examples and explicit computations illustrate the main concepts. Each of the six chapters concludes with problems that will help the readers to practice their tropical skills, and to gain access to the research literature. This wonderful book will appeal to students and researchers of all stripes: it begins at an undergraduate level and ends with deep connections to toric varieties, compactifications, and degenerations. In between, the authors provide the first complete proofs in book form of many fundamental results in the subject. The pages are sprinkled with*

illuminating examples, applications, and exercises, and the writing is lucid and meticulous throughout. It is that rare kind of book which will be used equally as an introductory text by students and as a reference for experts. —Matt Baker, Georgia Institute of Technology Tropical geometry is an exciting new field, which requires tools from various parts of mathematics and has connections with many areas. A short definition is given by Maclagan and Sturmfels: "Tropical geometry is a marriage between algebraic and polyhedral geometry". This wonderful book is a pleasant and rewarding journey through different landscapes, inviting the readers from a day at a beach to the hills of modern algebraic geometry. The authors present building blocks, examples and exercises as well as recent results in tropical geometry, with ingredients from algebra, combinatorics, symbolic computation, polyhedral geometry and algebraic geometry. The volume will appeal both to beginning graduate students willing to enter the field and to researchers, including experts. —Alicia Dickenstein, University of Buenos Aires, Argentina

Introduction to Complex Hyperbolic Spaces

Springer Science & Business Media *Since the appearance of Kobayashi's book, there have been several re sults at the basic level of hyperbolic spaces, for instance Brody's theorem, and results of Green, Kiernan, Kobayashi, Noguchi, etc. which make it worthwhile to have a systematic exposition. Although of necessity I re produce some theorems from Kobayashi, I take a different direction, with different applications in mind, so the present book does not super sede Kobayashi's. My interest in these matters stems from their relations with diophan tine geometry. Indeed, if X is a projective variety over the complex numbers, then I conjecture that X is hyperbolic if and only if X has only a finite number of rational points in every finitely generated field over the rational numbers. There are also a number of subsidiary conjectures related to this one. These conjectures are qualitative. Vojta has made quantitative conjectures by relating the Second Main Theorem of Nevan linna theory to the theory of heights, and he has conjectured bounds on heights stemming from inequalities having to do with diophantine approximations and implying both classical and modern conjectures. Noguchi has looked at the function field case and made substantial progress, after the line started by Grauert and Grauert-Reckziegel and continued by a recent paper of Riebesehl. The book is divided into three main parts: the basic complex analytic theory, differential geometric aspects, and Nevanlinna theory. Several chapters of this book are logically independent of each other.*

An Introduction to Noncommutative

Differential Geometry and Its Physical Applications

Cambridge University Press *A thoroughly revised introduction to non-commutative geometry.*

Introduction to Geometric Computing

Springer Science & Business Media *Computing is quickly making much of geometry intriguing not only for philosophers and mathematicians, but also for scientists and engineers. What is the core set of topics that a practitioner needs to study before embarking on the design and implementation of a geometric system in a specialized discipline? This book attempts to find the answer. Every programmer tackling a geometric computing problem encounters design decisions that need to be solved. This book reviews the geometric theory then applies it in an attempt to find that elusive "right" design.*

Introduction to Differential Geometry

Springer Spektrum *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.*

Introduction to the Geometry of

Complex Numbers ... Translated from the Revised French Edition, by Howard Eves