

# 1. Complex Variables & Functions

From § 1.8 :

Complex numbers :  $\mathbb{C} = \{ z = x + iy ; \forall x, y \in \mathbb{R} \}$  (Ordered pair of real numbers )

Complex conjugate :  $z^* = x - iy$

Polar representation :  $z = r e^{i\theta} = r e^{i(\theta + 2\pi n)}$

$r = \sqrt{x^2 + y^2}$  modulus

$\theta = \tan^{-1} \frac{y}{x}$  argument

$$\rightarrow e^{i\theta} = \cos \theta + i \sin \theta$$

Multi-valued function  $\rightarrow$  single-valued in each branch

E.g.,  $z^{1/m} = r^{1/m} e^{i(\theta + 2\pi n)/m}$  has  $m$  branches.

$\ln z = \ln r + i(\theta + 2\pi n)$  has an infinite number of branches.

# Topics In Several Complex Variables

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Sadullaev**

## **Topics In Several Complex Variables:**

*Lectures on Several Complex Variables* Paul M. Gauthier, 2014-11-07 This monograph provides a concise accessible snapshot of key topics in several complex variables including the Cauchy Integral Formula sequences of holomorphic functions plurisubharmonic functions the Dirichlet problem and meromorphic functions Based on a course given at Universit de Montr al this brief introduction covers areas of contemporary importance that are not mentioned in most treatments of the subject such as modular forms which are essential for Wiles theorem and the unification of quantum theory and general relativity Also covered is the Riemann manifold of a function which generalizes the Riemann surface of a function of a single complex variable and is a topic that is well known in one complex variable but rarely treated in several variables Many details which are intentionally left out as well as many theorems are stated as problems providing students with carefully structured instructive exercises Prerequisites for use of this book are functions of one complex variable functions of several real variables and topology all at the undergraduate level Lectures on Several Complex Variables will be of interest to advanced undergraduate and beginning undergraduate students as well as mathematical researchers and professors

*Topics in Several Complex Variables* Randall Fred Westhoff, 1987 This thesis introduces some of the main topics in several complex variables in a fashion clear and readable to a beginning graduate student The motivation for this expository treatment arises from the observation that all of the existing texts appear to address an audience of more advanced graduate students Thus the present thesis may serve as an introduction to several complex variables for other masters students The topics presented show how the field of several complex variables relies on many of the other branches of mathematics This thesis also demonstrates some important differences between several complex variables single variable complex analysis and the real variable theory Document

*Topics in Several Complex Variables* Zair Ibragimov, Norman Levenberg, Sergey Pinchuk, Azimbay Sadullaev, 2016-04-21 This volume contains the proceedings of the Special Session on Several Complex Variables which was held during the first USA Uzbekistan Conference on Analysis and Mathematical Physics from May 20-23 2014 at California State University Fullerton This volume covers a wide variety of topics in pluripotential theory symplectic geometry and almost complex structures integral formulas holomorphic extension and complex dynamics In particular the reader will find articles on Lagrangian submanifolds and rational convexity multidimensional residues S parabolic Stein manifolds Segre varieties and the theory of quasianalytic functions

**Several Complex Variables** Raghavan Narasimhan, 1971 Drawn from lectures given by Raghavan Narasimhan at the University of Geneva and the University of Chicago this book presents the part of the theory of several complex variables pertaining to unramified domains over  $\mathbb{C}$  Topics discussed are Hartogs theory domains in holomorphy and automorphism of bounded domains

**Topics in Several Complex Variables** Nordic Summer School of Mathematics, 1968

**First Steps in Several Complex Variables** Marek Jarnicki, Peter Pflug, 2008 This book provides a comprehensive introduction to the field of several complex variables in the

setting of a very special but basic class of domains the so called Reinhardt domains In this way the reader may learn much about this area without encountering too many technical difficulties Chapter 1 describes the fundamental notions and the phenomenon of simultaneous holomorphic extension Chapter 2 presents a fairly complete discussion of biholomorphisms of bounded complete Reinhardt domains in the two dimensional case The third chapter gives a classification of Reinhardt domains of existence for the most important classes of holomorphic functions The last chapter deals with invariant functions and gives explicit calculations of many of them on certain Reinhardt domains Numerous exercises are included to help the readers with their understanding of the material Further results and open problems are added which may be useful as seminar topics The primary aim of this book is to introduce students or non experts to some of the main research areas in several complex variables The book provides a friendly invitation to this field as the only prerequisite is a basic knowledge of analysis

Topics in several complex variables Adrien Dovady,1967      **Topics in Several Complex Variables D.**

Sundararaman,1985 This book provides an overview of currently active and rapidly developing areas of several complex variables differential geometry and group representations The featured papers are written by experts and researchers and give new insights into the topics they deal with and new results of the relevant theories and problems Apart from the applications to the traditional area of mathematical physics applications to the new area of computerized tomography are also included

Topics in the Theory of Functions of Several Complex Variables William Osgood,1913      **Several Complex Variables in China** Chung-Chun Yang,Sheng Gong,1993 Today there is increasing interest in complex geometry geometric function theory and integral representation theory of several complex variables The present collection of survey and research articles comprises a current overview of research in several complex variables in China Among the topics covered are singular integrals function spaces differential operators and factorization of meromorphic functions in several complex variables via analytic or geometric methods Some results are reported in English for the first time

**Topics in the Theory of Functions of Several Complex Variables** William Fogg Osgood,1914      Introduction to Complex Analysis in Several Variables Volker Scheidemann,2023-04-26 This book gives a comprehensive introduction to complex analysis in several variables While it focusses on a number of topics in complex analysis rather than trying to cover as much material as possible references to other parts of mathematics such as functional analysis or algebras are made to help broaden the view and the understanding of the chosen topics A major focus are extension phenomena alien to the one dimensional theory which are expressed in the famous Hartog s Kugelsatz the theorem of Cartan Thullen and Bochner s theorem The book aims primarily at students starting to work in the field of complex analysis in several variables and instructors preparing a course To that end a lot of examples and supporting exercises are provided throughout the text This second edition includes hints and suggestions for the solution of the provided exercises with various degrees of support

*Topics in the Theory of Function of Several Complex Variables* ,1914      **Holomorphic Functions and Integral Representations in Several Complex**

**Variables** R. Michael Range, 1998-06-26 The subject of this book is Complex Analysis in Several Variables This text begins at an elementary level with standard local results followed by a thorough discussion of the various fundamental concepts of complex convexity related to the remarkable extension properties of holomorphic functions in more than one variable It then continues with a comprehensive introduction to integral representations and concludes with complete proofs of substantial global results on domains of holomorphy and on strictly pseudoconvex domains in  $\mathbb{C}$  including for example Carathéodory's famous Mapping Theorem The most important new feature of this book is the systematic inclusion of many of the developments of the last 20 years which centered around integral representations and estimates for the Cauchy Riemann equations In particular integral representations are the principal tool used to develop the global theory in contrast to many earlier books on the subject which involved methods from commutative algebra and sheaf theory and or partial differential equations I believe that this approach offers several advantages 1 it uses the several variable version of tools familiar to the analyst in one complex variable and therefore helps to bridge the often perceived gap between complex analysis in one and in several variables 2 it leads quite directly to deep global results without introducing a lot of new machinery and 3 concrete integral representations lend themselves to estimations therefore opening the door to applications not accessible by the earlier methods

Several Complex Variables and Complex Manifolds Mike Field, 1982 Annotation This self contained and relatively elementary introduction to functions of several complex variables and complex especially compact manifolds is intended to be a synthesis of those topics and a broad introduction to the field Part I is suitable for advanced undergraduates and beginning postgraduates whilst Part II is written more for the graduate student The work as a whole will be useful to professional mathematicians or mathematical physicists who wish to acquire a working knowledge of this area of mathematics Many exercises have been included and indeed they form an integral part of the text The prerequisites for understanding Part I would be met by any mathematics student with a first degree and together the two parts provide an introduction to the more advanced works in the subject

**Topics in Several Complex Variables** E. R. Arellano, 1986-05-01

**Topics in Several Complex Variables** Adrien Douady, 1970

Value Distribution Theory and Related Topics Grigor A. Barsegian, Ilpo Laine, Chung-Chun Yang, 2006-05-02 The Nevanlinna theory of value distribution of meromorphic functions one of the milestones of complex analysis during the last century was created to extend the classical results concerning the distribution of entire functions to the more general setting of meromorphic functions Later on a similar reasoning has been applied to algebroid functions subharmonic functions and meromorphic functions on Riemann surfaces as well as to analytic functions of several complex variables holomorphic and meromorphic mappings and to the theory of minimal surfaces Moreover several applications of the theory have been exploited including complex differential and functional equations complex dynamics and Diophantine equations The main emphasis of this collection is to direct attention to a number of recently developed novel ideas and generalizations that relate to the development of value distribution theory

and its applications In particular we mean a recent theory that replaces the conventional consideration of counting within a disc by an analysis of their geometric locations Another such example is presented by the generalizations of the second main theorem to higher dimensional cases by using the jet theory Moreover similar ideas apparently may be applied to several related areas as well such as to partial differential equations and to differential geometry Indeed most of these applications go back to the problem of analyzing zeros of certain complex or real functions meaning in fact to investigate level sets or level surfaces

The Mathematical Heritage of Henri Poincaré Felix E. Browder, 1983 On April 7-10 1980 the American Mathematical Society sponsored a Symposium on the Mathematical Heritage of Henri Poincaré held at Indiana University Bloomington Indiana This title presents the written versions of this Symposium It contains two papers by invited speakers who were not able to attend S S Chern and L Nirenberg

**Several Complex Variables with Connections to Algebraic Geometry and Lie Groups** Joseph L. Taylor, 2002 This text presents an integrated development of core material from several complex variables and complex algebraic geometry leading to proofs of Serre's celebrated GAGA theorems relating the two subjects and including applications to the representation theory of complex semisimple Lie groups It includes a thorough treatment of the local theory using the tools of commutative algebra an extensive development of sheaf theory and the theory of coherent analytic and algebraic sheaves proofs of the main vanishing theorems for these categories of sheaves and a complete proof of the finite dimensionality of the cohomology of coherent sheaves on compact varieties The vanishing theorems have a wide variety of applications and these are covered in detail Of particular interest are the last three chapters which are devoted to applications of the preceding material to the study of the structure theory and representation theory of complex semisimple Lie groups Included are introductions to harmonic analysis the Peter Weyl theorem Lie theory and the structure of Lie algebras semisimple Lie algebras and their representations algebraic groups and the structure of complex semisimple Lie groups All of this culminates in Milicic's proof of the Borel-Weil-Bott theorem which makes extensive use of the material developed earlier in the text There are numerous examples and exercises in each chapter This modern treatment of a classic point of view would be an excellent text for a graduate course on several complex variables as well as a useful reference for the expert

## **Topics In Several Complex Variables** Book Review: Unveiling the Power of Words

In a world driven by information and connectivity, the power of words has become more evident than ever. They have the capability to inspire, provoke, and ignite change. Such is the essence of the book **Topics In Several Complex Variables**, a literary masterpiece that delves deep in to the significance of words and their affect our lives. Compiled by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we will explore the book is key themes, examine its writing style, and analyze its overall affect readers.

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### **Table of Contents Topics In Several Complex Variables**

1. Understanding the eBook Topics In Several Complex Variables
  - The Rise of Digital Reading Topics In Several Complex Variables
  - Advantages of eBooks Over Traditional Books
2. Identifying Topics In Several Complex Variables
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Topics In Several Complex Variables
  - User-Friendly Interface
4. Exploring eBook Recommendations from Topics In Several Complex Variables
  - Personalized Recommendations
  - Topics In Several Complex Variables User Reviews and Ratings
  - Topics In Several Complex Variables and Bestseller Lists
5. Accessing Topics In Several Complex Variables Free and Paid eBooks

- Topics In Several Complex Variables Public Domain eBooks
  - Topics In Several Complex Variables eBook Subscription Services
  - Topics In Several Complex Variables Budget-Friendly Options
6. Navigating Topics In Several Complex Variables eBook Formats
    - ePub, PDF, MOBI, and More
    - Topics In Several Complex Variables Compatibility with Devices
    - Topics In Several Complex Variables Enhanced eBook Features
  7. Enhancing Your Reading Experience
    - Adjustable Fonts and Text Sizes of Topics In Several Complex Variables
    - Highlighting and Note-Taking Topics In Several Complex Variables
    - Interactive Elements Topics In Several Complex Variables
  8. Staying Engaged with Topics In Several Complex Variables
    - Joining Online Reading Communities
    - Participating in Virtual Book Clubs
    - Following Authors and Publishers Topics In Several Complex Variables
  9. Balancing eBooks and Physical Books Topics In Several Complex Variables
    - Benefits of a Digital Library
    - Creating a Diverse Reading Collection Topics In Several Complex Variables
  10. Overcoming Reading Challenges
    - Dealing with Digital Eye Strain
    - Minimizing Distractions
    - Managing Screen Time
  11. Cultivating a Reading Routine Topics In Several Complex Variables
    - Setting Reading Goals Topics In Several Complex Variables
    - Carving Out Dedicated Reading Time
  12. Sourcing Reliable Information of Topics In Several Complex Variables
    - Fact-Checking eBook Content of Topics In Several Complex Variables
    - Distinguishing Credible Sources
  13. Promoting Lifelong Learning
    - Utilizing eBooks for Skill Development

- Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
  - Interactive and Gamified eBooks

### **Topics In Several Complex Variables Introduction**

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