

FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS

FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS UNLOCKING THE SECRETS OF A BEAUTIFUL WORLD THIS RESOURCE DIVES DEEP INTO THE FASCINATING WORLD OF COMPLEX ANALYSIS PROVIDING COMPREHENSIVE SOLUTIONS TO PROBLEMS ENCOUNTERED IN INTRODUCTORY COURSES FROM THE BASIC DEFINITIONS AND THEOREMS TO THE MORE ADVANCED APPLICATIONS THIS GUIDE OFFERS A CLEAR AND CONCISE PATH TO UNDERSTANDING AND MASTERING THIS ESSENTIAL BRANCH OF MATHEMATICS COMPLEX ANALYSIS SOLUTIONS PROBLEMS EXERCISES THEORY APPLICATIONS FUNCTIONS CAUCHY RIEMANN EQUATIONS RESIDUES CONFORMAL MAPPING LAURENT SERIES SINGULARITIES COMPLEX INTEGRATION THE STUDY OF COMPLEX ANALYSIS OPENS THE DOOR TO A WORLD OF ELEGANCE AND POWER OFFERING A UNIQUE LENS THROUGH WHICH TO VIEW VARIOUS FIELDS INCLUDING PHYSICS ENGINEERING AND EVEN ECONOMICS THIS COLLECTION OF SOLUTIONS SERVES AS A COMPANION TO ANY INTRODUCTORY COMPLEX ANALYSIS TEXTBOOK PROVIDING STEP-BY-STEP EXPLANATIONS INSIGHTFUL OBSERVATIONS AND PRACTICAL TECHNIQUES TO CONQUER THE INTRICACIES OF THIS SUBJECT NAVIGATING THE LABYRINTH OF COMPLEX ANALYSIS THIS RESOURCE IS DESIGNED TO GUIDE YOU THROUGH THE FUNDAMENTAL CONCEPTS OF COMPLEX ANALYSIS BUILDING A STRONG FOUNDATION FOR FURTHER EXPLORATION HERES A GLIMPSE INTO THE TOPICS COVERED FOUNDATIONS WE BEGIN BY DEFINING THE ESSENTIAL BUILDING BLOCKS OF COMPLEX NUMBERS INCLUDING THEIR ARITHMETIC OPERATIONS AND GEOMETRIC INTERPRETATION THIS FOUNDATION PAVES THE WAY FOR UNDERSTANDING THE COMPLEXITIES OF FUNCTIONS OPERATING IN THIS UNIQUE SPACE FUNCTIONS OF A COMPLEX VARIABLE THE EXPLORATION DELVES INTO THE WORLD OF COMPLEX FUNCTIONS EXAMINING THEIR PROPERTIES DIFFERENTIATION AND INTEGRATION CONCEPTS LIKE ANALYTIC FUNCTIONS HARMONIC FUNCTIONS AND THE CAUCHY-RIEMANN EQUATIONS ARE EXPLAINED WITH CLARITY AND EXAMPLES INTEGRATION AND CAUCHY'S THEOREM THE POWER OF COMPLEX INTEGRATION IS UNVEILED DEMONSTRATING ITS ABILITY TO SOLVE PROBLEMS THAT ARE INTRACTABLE IN REAL ANALYSIS CAUCHY'S INTEGRAL THEOREM AND ITS COROLLARIES ALONG WITH THE RESIDUE THEOREM ARE EXPLORED WITH RIGOROUS EXPLANATIONS AND APPLICATIONS 2 SERIES AND SINGULARITIES LAURENT SERIES A POWERFUL TOOL FOR ANALYZING FUNCTIONS NEAR THEIR SINGULARITIES ARE INTRODUCED UNDERSTANDING SINGULARITIES POLES ESSENTIAL SINGULARITIES AND BRANCH POINTS ALLOWS FOR DEEPER INSIGHT INTO THE BEHAVIOR OF COMPLEX FUNCTIONS CONFORMAL MAPPINGS THESE TRANSFORMATIONS WHICH PRESERVE ANGLES AND LOCAL SHAPES ARE EXPLORED HIGHLIGHTING THEIR APPLICATIONS IN SOLVING BOUNDARY VALUE PROBLEMS AND VISUALIZING COMPLEX FUNCTIONS THOUGHT-PROVOKING CONCLUSION COMPLEX ANALYSIS WHILE SEEMINGLY ABSTRACT OFFERS A UNIQUE PERSPECTIVE ON THE WORLD AROUND US IT ALLOWS US TO VISUALIZE AND MANIPULATE COMPLEX SYSTEMS UNLOCKING HIDDEN INSIGHTS AND SOLUTIONS ITS BEAUTY LIES IN ITS ABILITY TO CONNECT SEEMINGLY DISPARATE CONCEPTS REVEALING INTRICATE RELATIONSHIPS BETWEEN VARIOUS FIELDS AS YOU NAVIGATE THIS WORLD OF COMPLEX NUMBERS AND FUNCTIONS REMEMBER THAT THE JOURNEY ITSELF IS AS REWARDING AS THE DESTINATION FAQs 1 WHY IS COMPLEX ANALYSIS IMPORTANT COMPLEX ANALYSIS FINDS WIDE APPLICATIONS IN VARIOUS FIELDS INCLUDING PHYSICS SOLVING PROBLEMS IN ELECTROMAGNETISM FLUID DYNAMICS AND QUANTUM MECHANICS ENGINEERING ANALYZING CIRCUITS DESIGNING ANTENNAS AND OPTIMIZING SIGNAL PROCESSING ECONOMICS MODELING FINANCIAL MARKETS AND PREDICTING ECONOMIC TRENDS 2 WHAT ARE THE PREREQUISITES FOR STUDYING COMPLEX ANALYSIS A STRONG FOUNDATION IN CALCULUS AND LINEAR ALGEBRA IS ESSENTIAL FAMILIARITY WITH BASIC CONCEPTS IN REAL ANALYSIS SUCH AS LIMITS CONTINUITY AND DERIVATIVES WILL ALSO BE BENEFICIAL 3 HOW CAN I IMPROVE MY UNDERSTANDING OF COMPLEX ANALYSIS PRACTICE PRACTICE PRACTICE WORK THROUGH NUMEROUS PROBLEMS TO SOLIDIFY YOUR GRASP OF THE CONCEPTS VISUALIZE UTILIZE GEOMETRIC INTERPRETATIONS TO GAIN A DEEPER UNDERSTANDING OF FUNCTIONS AND THEOREMS SEEK HELP DONT HESITATE TO ASK YOUR INSTRUCTOR CLASSMATES OR ONLINE RESOURCES FOR CLARIFICATION 4 ARE THERE ANY REAL-WORLD APPLICATIONS OF COMPLEX ANALYSIS INDEED COMPLEX ANALYSIS PLAYS A VITAL ROLE IN FOURIER ANALYSIS ANALYZING SIGNALS AND DECOMPOSING THEM INTO THEIR CONSTITUENT FREQUENCIES 3 FLUID DYNAMICS MODELING THE FLOW OF FLUIDS INCLUDING AIRFLOW AROUND AIRCRAFT WINGS QUANTUM MECHANICS DESCRIBING THE WAVE-PARTICLE DUALITY OF MATTER 5 HOW CAN I CONNECT THE ABSTRACT CONCEPTS OF COMPLEX ANALYSIS TO THE REAL WORLD LOOK FOR EXAMPLES AND APPLICATIONS IN YOUR CHOSEN FIELD RELATE COMPLEX ANALYSIS TO REAL-WORLD PROBLEMS AND SEE HOW IT CAN PROVIDE VALUABLE INSIGHTS AND SOLUTIONS DONT BE AFRAID TO EXPLORE THE CONNECTIONS BETWEEN MATHEMATICS AND THE WORLD AROUND YOU

Complex Functions: An Introduction to Complex AnalysisComplex AnalysisComplex Analysis and Its ApplicationsFUNDAMENTALS OF COMPLEX ANALYSISFUNDAMENTALS OF COMPLEX ANALYSIS WITH APPLICATIONS TO ENGINEERING AND SCIENCE (CLASSIC VERSION)A COURSE IN COMPLEX ANALYSISCOMPLEX ANALYSISAN INTRODUCTION TO COMPLEX ANALYSISCOMPLEX ANALYSIS AND APPLICATIONS, SECOND

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DISCOVER THE ELEGANT AND POWERFUL WORLD OF COMPLEX ANALYSIS IN THIS COMPREHENSIVE INTRODUCTION
 TO ONE OF MATHEMATICS MOST BEAUTIFUL SUBJECTS COMPLEX FUNCTIONS AN INTRODUCTION TO COMPLEX
 ANALYSIS BRIDGES THE GAP BETWEEN INTRODUCTORY CALCULUS AND ADVANCED MATHEMATICAL THEORY
 REVEALING HOW THE SIMPLE ADDITION OF THE IMAGINARY UNIT TRANSFORMS MATHEMATICS INTO SOMETHING
 EXTRAORDINARY COMPLEX ANALYSIS STANDS AS A CORNERSTONE OF MODERN MATHEMATICS PHYSICS AND
 ENGINEERING OFFERING TOOLS OF REMARKABLE POWER AND ELEGANCE WHETHER YOU'RE A MATHEMATICS STUDENT
 SEEKING DEEPER UNDERSTANDING A PHYSICIST REQUIRING ANALYTICAL TECHNIQUES OR AN ENGINEER SOLVING
 PRACTICAL PROBLEMS THIS BOOK PROVIDES THE FOUNDATION YOU NEED TO MASTER THIS ESSENTIAL FIELD
 WRITTEN WITH CLARITY AND PRECISION THIS TEXT BALANCES THEORETICAL RIGOR WITH INTUITIVE
 EXPLANATIONS MAKING ABSTRACT CONCEPTS ACCESSIBLE WITHOUT SACRIFICING MATHEMATICAL DEPTH FROM
 THE FOUNDATIONS OF COMPLEX NUMBERS TO THE FRONTIERS OF MODERN RESEARCH THIS BOOK GUIDES YOU
 THROUGH THE FASCINATING LANDSCAPE OF COMPLEX FUNCTIONS WITH CAREFULLY CRAFTED EXAMPLES AND
 APPLICATIONS WHAT YOU WILL FIND IN THIS BOOK A SYSTEMATIC DEVELOPMENT OF COMPLEX ANALYSIS FROM
 FIRST PRINCIPLES CLEAR EXPLANATIONS OF KEY CONCEPTS LIKE HOLOMORPHIC FUNCTIONS CONTOUR
 INTEGRATION AND RESIDUE THEORY GEOMETRIC INTERPRETATIONS THAT BUILD INTUITION AND UNDERSTANDING
 POWERFUL TECHNIQUES FOR SOLVING INTEGRALS AND DIFFERENTIAL EQUATIONS APPLICATIONS TO PHYSICS
 ENGINEERING AND PURE MATHEMATICS HISTORICAL NOTES HIGHLIGHTING THE DEVELOPMENT OF IMPORTANT IDEAS
 CAREFULLY SELECTED EXERCISES RANGING FROM COMPUTATIONAL PRACTICE TO THEORETICAL EXPLORATIONS
 CONNECTIONS BETWEEN COMPLEX ANALYSIS AND OTHER BRANCHES OF MATHEMATICS TRANSFORM YOUR
 MATHEMATICAL THINKING WITH COMPLEX ANALYSIS WHERE ALGEBRAIC GEOMETRIC AND ANALYTIC ASPECTS OF
 MATHEMATICS UNITE IN PERFECT HARMONY WHETHER YOU'RE ENCOUNTERING THESE IDEAS FOR THE FIRST TIME OR
 SEEKING A DEEPER UNDERSTANDING THIS BOOK WILL OPEN YOUR EYES TO THE REMARKABLE WORLD WHERE
 MATHEMATICS ACHIEVES ITS MOST BEAUTIFUL AND POWERFUL EXPRESSION

THIS BOOK DISCUSSES ALL THE MAJOR TOPICS OF COMPLEX ANALYSIS BEGINNING WITH THE PROPERTIES OF
 COMPLEX NUMBERS AND ENDING WITH THE PROOFS OF THE FUNDAMENTAL PRINCIPLES OF CONFORMAL MAPPINGS
 TOPICS COVERED IN THE BOOK INCLUDE THE STUDY OF HOLOMORPHIC AND ANALYTIC FUNCTIONS
 CLASSIFICATION OF SINGULAR POINTS AND THE LAURENT SERIES EXPANSION THEORY OF RESIDUES AND THEIR
 APPLICATION TO EVALUATION OF INTEGRALS SYSTEMATIC STUDY OF ELEMENTARY FUNCTIONS ANALYSIS OF
 CONFORMAL MAPPINGS AND THEIR APPLICATIONS MAKING THIS BOOK SELF SUFFICIENT AND THE READER
 INDEPENDENT OF ANY OTHER TEXTS ON COMPLEX VARIABLES THE BOOK IS AIMED AT THE ADVANCED
 UNDERGRADUATE STUDENTS OF MATHEMATICS AND ENGINEERING AS WELL AS THOSE INTERESTED IN STUDYING
 COMPLEX ANALYSIS WITH A GOOD WORKING KNOWLEDGE OF ADVANCED CALCULUS THE MATHEMATICAL LEVEL
 OF THE EXPOSITION CORRESPONDS TO ADVANCED UNDERGRADUATE COURSES OF MATHEMATICAL ANALYSIS AND
 FIRST GRADUATE INTRODUCTION TO THE DISCIPLINE THE BOOK CONTAINS A LARGE NUMBER OF PROBLEMS AND
 EXERCISES MAKING IT SUITABLE FOR BOTH CLASSROOM USE AND SELF STUDY MANY STANDARD EXERCISES ARE
 INCLUDED IN EACH SECTION TO DEVELOP BASIC SKILLS AND TEST THE UNDERSTANDING OF CONCEPTS OTHER
 PROBLEMS ARE MORE THEORETICALLY ORIENTED AND ILLUSTRATE INTRICATE POINTS OF THE THEORY MANY
 ADDITIONAL PROBLEMS ARE PROPOSED AS HOMEWORK TASKS WHOSE LEVEL RANGES FROM STRAIGHTFORWARD
 BUT NOT OVERLY SIMPLE EXERCISES TO PROBLEMS OF CONSIDERABLE DIFFICULTY BUT OF COMPARABLE INTEREST

THIS VOLUME PRESENTS A COLLECTION OF CONTRIBUTIONS TO AN INTERNATIONAL CONFERENCE ON COMPLEX ANALYSIS AND ITS APPLICATIONS HELD AT THE NEWLY FOUNDED HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY IN JANUARY 1993 THE AIM OF THE CONFERENCE WAS TO ADVANCE THE THEORETICAL ASPECTS OF COMPLEX ANALYSIS AND TO EXPLORE THE APPLICATION OF ITS TECHNIQUES TO PHYSICAL AND ENGINEERING PROBLEMS THREE MAIN AREAS WERE EMPHASISED VALUE DISTRIBUTION THEORY COMPLEX DYNAMICAL SYSTEM AND GEOMETRIC FUNCTION THEORY AND THE APPLICATION OF COMPLEX ANALYSIS TO DIFFERENTIAL EQUATIONS AND PHYSICAL ENGINEERING PROBLEMS

THE BOOK DIVIDED IN TEN CHAPTERS DEALS WITH ALGEBRA OF COMPLEX NUMBERS AND ITS VARIOUS GEOMETRICAL PROPERTIES PROPERTIES OF POLAR FORM OF COMPLEX NUMBERS AND REGIONS IN THE COMPLEX PLANE LIMIT CONTINUITY DIFFERENTIABILITY DIFFERENT KINDS OF COMPLEX VALUED FUNCTIONS DIFFERENT TYPES OF TRANSFORMATIONS CONFORMAL MAPPINGS OF DIFFERENT FUNCTIONS PROPERTIES OF BILINEAR AND SPECIAL BILINEAR TRANSFORMATION LINE INTEGRALS THEIR PROPERTIES AND DIFFERENT THEOREMS SEQUENCES AND SERIES POWER SERIES ZEROS OF FUNCTIONS RESIDUES AND RESIDUE THEOREM MEROMORPHIC FUNCTIONS DIFFERENT KINDS OF SINGULARITIES EVALUATION OF REAL INTEGRALS ANALYTIC CONTINUATION CONSTRUCTION OF HARMONIC FUNCTIONS INFINITE PRODUCT THEIR PROPERTIES AND GAMMA FUNCTION SCHWARZ CHRISTOFFEL TRANSFORMATIONS MAPPING BY MULTI VALUED FUNCTIONS ENTIRE FUNCTIONS JENSEN'S THEOREM AND POISSON JENSEN THEOREM THE BOOK IS DESIGNED AS A TEXTBOOK FOR UG AND PG STUDENTS OF SCIENCE AS WELL AS ENGINEERING

THIS TITLE IS PART OF THE PEARSON MODERN CLASSICS SERIES PEARSON MODERN CLASSICS ARE ACCLAIMED TITLES AT A VALUE PRICE PLEASE VISIT PEARSONHIGHERED.COM MATH CLASSICS SERIES FOR A COMPLETE LIST OF TITLES THIS IS THE BEST SELLER IN THIS MARKET IT PROVIDES A COMPREHENSIVE INTRODUCTION TO COMPLEX VARIABLE THEORY AND ITS APPLICATIONS TO CURRENT ENGINEERING PROBLEMS IT IS DESIGNED TO MAKE THE FUNDAMENTALS OF THE SUBJECT MORE EASILY ACCESSIBLE TO STUDENTS WHO HAVE LITTLE INCLINATION TO WADE THROUGH THE RIGORS OF THE AXIOMATIC APPROACH MODELED AFTER STANDARD CALCULUS BOOKS BOTH IN LEVEL OF EXPOSITION AND LAYOUT IT INCORPORATES PHYSICAL APPLICATIONS THROUGHOUT THE PRESENTATION SO THAT THE MATHEMATICAL METHODOLOGY APPEARS LESS STERILE TO ENGINEERING STUDENTS

THIS CAREFULLY WRITTEN TEXTBOOK IS AN INTRODUCTION TO THE BEAUTIFUL CONCEPTS AND RESULTS OF COMPLEX ANALYSIS IT IS INTENDED FOR INTERNATIONAL BACHELOR AND MASTER PROGRAMMES IN GERMANY AND THROUGHOUT EUROPE IN THE ANGLO AMERICAN SYSTEM OF UNIVERSITY EDUCATION THE CONTENT CORRESPONDS TO A BEGINNING GRADUATE COURSE THE BOOK PRESENTS THE FUNDAMENTAL RESULTS AND METHODS OF COMPLEX ANALYSIS AND APPLIES THEM TO A STUDY OF ELEMENTARY AND NON ELEMENTARY FUNCTIONS ELLIPTIC FUNCTIONS GAMMA AND ZETA FUNCTION INCLUDING A PROOF OF THE PRIME NUMBER THEOREM AND A NEW FEATURE IN THIS CONTEXT TO EXHIBITING BASIC FACTS IN THE THEORY OF SEVERAL COMPLEX VARIABLES PART OF THE BOOK IS A TRANSLATION OF THE AUTHORS GERMAN TEXT EINFÜHRUNG IN DIE KOMPLEXE ANALYSIS SOME MATERIAL WAS ADDED FROM THE BY NOW ALMOST CLASSICAL TEXT FUNKTIONENTHEORIE WRITTEN BY THE AUTHORS AND A FEW PARAGRAPHS WERE NEWLY WRITTEN FOR SPECIAL USE IN A MASTER'S PROGRAMME

DESIGNED FOR THE UNDERGRADUATE STUDENT WITH A CALCULUS BACKGROUND BUT NO PRIOR EXPERIENCE WITH COMPLEX ANALYSIS THIS TEXT DISCUSSES THE THEORY OF THE MOST RELEVANT MATHEMATICAL TOPICS IN A STUDENT FRIENDLY MANNER WITH A CLEAR AND STRAIGHTFORWARD WRITING STYLE CONCEPTS ARE INTRODUCED THROUGH NUMEROUS EXAMPLES ILLUSTRATIONS AND APPLICATIONS EACH SECTION OF THE TEXT CONTAINS AN EXTENSIVE EXERCISE SET CONTAINING A RANGE OF COMPUTATIONAL CONCEPTUAL AND GEOMETRIC PROBLEMS IN THE TEXT AND EXERCISES STUDENTS ARE GUIDED AND SUPPORTED THROUGH NUMEROUS PROOFS PROVIDING THEM WITH A HIGHER LEVEL OF MATHEMATICAL INSIGHT AND MATURITY EACH CHAPTER CONTAINS A SEPARATE SECTION DEVOTED EXCLUSIVELY TO THE APPLICATIONS OF COMPLEX ANALYSIS TO SCIENCE AND ENGINEERING PROVIDING STUDENTS WITH THE OPPORTUNITY TO DEVELOP A PRACTICAL AND CLEAR UNDERSTANDING OF COMPLEX ANALYSIS THE MATHEMATICA SYNTAX FROM THE SECOND EDITION HAS BEEN UPDATED TO COINCIDE WITH VERSION 8 OF THE SOFTWARE

LIKE REAL ANALYSIS COMPLEX ANALYSIS HAS GENERATED METHODS INDISPENSABLE TO MATHEMATICS AND ITS APPLICATIONS EXPLORING THE INTERACTIONS BETWEEN THESE TWO BRANCHES THIS BOOK USES THE RESULTS OF REAL ANALYSIS TO LAY THE FOUNDATIONS OF COMPLEX ANALYSIS AND PRESENTS A UNIFIED STRUCTURE OF MATHEMATICAL ANALYSIS AS A WHOLE TO SET THE GROUNDWORK AND MITIGATE THE DIFFICULTIES NEWCOMERS OFTEN EXPERIENCE AN INTRODUCTION TO COMPLEX ANALYSIS BEGINS WITH A COMPLETE REVIEW OF CONCEPTS AND METHODS FROM REAL ANALYSIS SUCH AS METRIC SPACES AND THE GREEN GAUSS INTEGRAL FORMULA THE APPROACH LEADS TO BRIEF CLEAR PROOFS OF BASIC STATEMENTS A DISTINCT ADVANTAGE FOR THOSE MAINLY INTERESTED IN APPLICATIONS ALTERNATE APPROACHES SUCH AS FICHERA'S PROOF OF THE GOURSAT THEOREM AND ESTERMANN'S PROOF OF THE CAUCHY'S INTEGRAL THEOREM ARE ALSO PRESENTED FOR COMPARISON DISCUSSIONS INCLUDE HOLOMORPHIC FUNCTIONS THE WEIERSTRASS CONVERGENCE THEOREM ANALYTIC

CONTINUATION ISOLATED SINGULARITIES HOMOTOPY RESIDUE THEORY CONFORMAL MAPPINGS SPECIAL FUNCTIONS AND BOUNDARY VALUE PROBLEMS MORE THAN 200 EXAMPLES AND 150 EXERCISES ILLUSTRATE THE SUBJECT MATTER AND MAKE THIS BOOK AN IDEAL TEXT FOR UNIVERSITY COURSES ON COMPLEX ANALYSIS WHILE THE COMPREHENSIVE COMPILATION OF THEORIES AND SUCCINCT PROOFS MAKE THIS AN EXCELLENT VOLUME FOR REFERENCE

COMPLEX ANALYSIS AND APPLICATIONS SECOND EDITION EXPLAINS COMPLEX ANALYSIS FOR STUDENTS OF APPLIED MATHEMATICS AND ENGINEERING RESTRUCTURED AND COMPLETELY REVISED THIS TEXTBOOK FIRST DEVELOPS THE THEORY OF COMPLEX ANALYSIS AND THEN EXAMINES ITS GEOMETRICAL INTERPRETATION AND APPLICATION TO DIRICHLET AND NEUMANN BOUNDARY VALUE PROBLEMS A DISCUSSION OF COMPLEX ANALYSIS NOW FORMS THE FIRST THREE CHAPTERS OF THE BOOK WITH A DESCRIPTION OF CONFORMAL MAPPING AND ITS APPLICATION TO BOUNDARY VALUE PROBLEMS FOR THE TWO DIMENSIONAL LAPLACE EQUATION FORMING THE FINAL TWO CHAPTERS THIS NEW STRUCTURE ENABLES STUDENTS TO STUDY THEORY AND APPLICATIONS SEPARATELY AS NEEDED IN ORDER TO MAINTAIN BREVITY AND CLARITY THE TEXT LIMITS THE APPLICATION OF COMPLEX ANALYSIS TO TWO DIMENSIONAL BOUNDARY VALUE PROBLEMS RELATED TO TEMPERATURE DISTRIBUTION FLUID FLOW AND ELECTROSTATICS IN EACH CASE IN ORDER TO SHOW THE RELEVANCE OF COMPLEX ANALYSIS EACH APPLICATION IS PRECEDED BY MATHEMATICAL BACKGROUND THAT DEMONSTRATES HOW A REAL VALUED POTENTIAL FUNCTION AND ITS RELATED COMPLEX POTENTIAL CAN BE DERIVED FROM THE MATHEMATICS THAT DESCRIBES THE PHYSICAL SITUATION

THE BOOK CONSTITUTES A BASIC CONCISE YET RIGOROUS COURSE IN COMPLEX ANALYSIS FOR STUDENTS WHO HAVE STUDIED CALCULUS IN ONE AND SEVERAL VARIABLES BUT HAVE NOT PREVIOUSLY BEEN EXPOSED TO COMPLEX ANALYSIS THE TEXTBOOK SHOULD BE PARTICULARLY USEFUL AND RELEVANT FOR UNDERGRADUATE STUDENTS IN JOINT PROGRAMMES WITH MATHEMATICS AS WELL AS ENGINEERING STUDENTS THE AIM OF THE BOOK IS TO COVER THE BARE BONES OF THE SUBJECT WITH MINIMAL PREREQUISITES THE CORE CONTENT OF THE BOOK IS THE THREE MAIN PILLARS OF COMPLEX ANALYSIS THE CAUCHY RIEMANN EQUATIONS THE CAUCHY INTEGRAL THEOREM AND TAYLOR AND LAURENT SERIES EXPANSIONS EACH SECTION CONTAINS SEVERAL PROBLEMS WHICH ARE NOT PURELY DRILL EXERCISES BUT ARE RATHER MEANT TO REINFORCE THE FUNDAMENTAL CONCEPTS DETAILED SOLUTIONS TO ALL THE EXERCISES APPEAR AT THE END OF THE BOOK MAKING THE BOOK IDEAL ALSO FOR SELF STUDY THERE ARE MANY FIGURES ILLUSTRATING THE TEXT

THE BOOK CONSTITUTES A BASIC CONCISE YET RIGOROUS FIRST COURSE IN COMPLEX ANALYSIS FOR UNDERGRADUATE STUDENTS WHO HAVE STUDIED MULTIVARIABLE CALCULUS AND LINEAR ALGEBRA THE TEXTBOOK SHOULD BE PARTICULARLY USEFUL FOR STUDENTS OF JOINT PROGRAMMES WITH MATHEMATICS AS WELL AS ENGINEERING STUDENTS SEEKING RIGOUR THE AIM OF THE BOOK IS TO COVER THE BARE BONES OF THE SUBJECT WITH MINIMAL PREREQUISITES THE CORE CONTENT OF THE BOOK IS THE THREE MAIN PILLARS OF COMPLEX ANALYSIS THE CAUCHY RIEMANN EQUATIONS THE CAUCHY INTEGRAL THEOREM AND TAYLOR AND LAURENT SERIES EACH SECTION CONTAINS SEVERAL PROBLEMS WHICH ARE NOT DRILL EXERCISES BUT ARE MEANT TO REINFORCE THE FUNDAMENTAL CONCEPTS DETAILED SOLUTIONS TO ALL THE 243 EXERCISES APPEAR AT THE END OF THE BOOK MAKING THE BOOK IDEAL FOR SELF STUDY THERE ARE MANY FIGURES ILLUSTRATING THE TEXT THE SECOND EDITION CORRECTS ERRORS FROM THE FIRST EDITION AND INCLUDES 89 NEW EXERCISES SOME OF WHICH COVER AUXILIARY TOPICS THAT WERE OMITTED IN THE FIRST EDITION TWO NEW APPENDICES HAVE BEEN ADDED ONE CONTAINING A DETAILED RIGOROUS PROOF OF THE CAUCHY INTEGRAL THEOREM AND ANOTHER PROVIDING BACKGROUND IN REAL ANALYSIS NEEDED TO MAKE THE BOOK SELF CONTAINED

A FIRST COURSE IN COMPLEX ANALYSIS WITH APPLICATIONS LIMITS THEORETICAL COVERAGE TO ONLY WHAT IS NECESSARY AND CONVEYS IT IN A STUDENT FRIENDLY STYLE ITS AIM IS TO INTRODUCE THE BASIC PRINCIPLES AND APPLICATIONS OF COMPLEX ANALYSIS TO UNDERGRADUATES WHO HAVE NO PRIOR KNOWLEDGE OF THIS SUBJECT CONTENTS OF THE BOOK INCLUDE THE COMPLEX NUMBER SYSTEM COMPLEX FUNCTIONS AND SEQUENCES AS WELL AS REAL INTEGRALS IN ADDITION TO OTHER CONCEPTS OF CALCULUS AND THE FUNCTIONS OF A COMPLEX VARIABLE THIS TEXT IS WRITTEN FOR JUNIOR LEVEL UNDERGRADUATE STUDENTS WHO ARE MAJORING IN MATH PHYSICS COMPUTER SCIENCE AND ELECTRICAL ENGINEERING

THE SECOND EDITION OF THIS ACCLAIMED TEXT HELPS YOU APPLY THEORY TO REAL WORLD APPLICATIONS IN MATHEMATICS PHYSICS AND ENGINEERING IT EASILY GUIDES YOU THROUGH COMPLEX ANALYSIS WITH ITS EXCELLENT COVERAGE OF TOPICS SUCH AS SERIES RESIDUES AND THE EVALUATION OF INTEGRALS MULTI VALUED FUNCTIONS CONFORMAL MAPPING DISPERSION RELATIONS AND ANALYTIC CONTINUATION WORKED EXAMPLES PLUS A LARGE NUMBER OF ASSIGNED PROBLEMS HELP YOU UNDERSTAND HOW TO APPLY COMPLEX CONCEPTS AND BUILD YOUR OWN SKILLS BY PUTTING THEM INTO PRACTICE THIS EDITION FEATURES MANY NEW PROBLEMS REVISED SECTIONS AND AN ENTIRELY NEW CHAPTER ON ANALYTIC CONTINUATION

A CLEAR SELF CONTAINED TREATMENT OF IMPORTANT AREAS IN COMPLEX ANALYSIS THIS TEXT IS GEARED

TOWARD UPPER LEVEL UNDERGRADUATES AND GRADUATE STUDENTS CHIEFLY CLASSICAL IN CONTENT IT EMPHASIZES THE GEOMETRY OF COMPLEX MAPPINGS ADDITIONAL TOPICS INCLUDE MODULAR FUNCTION HADAMARD PRODUCT THEOREM AND PRIME NUMBER THEOREM 1967 EDITION

WITH THIS SECOND VOLUME WE ENTER THE INTRIGUING WORLD OF COMPLEX ANALYSIS FROM THE FIRST THEOREMS ON THE ELEGANCE AND SWEEP OF THE RESULTS IS EVIDENT THE STARTING POINT IS THE SIMPLE IDEA OF EXTENDING A FUNCTION INITIALLY GIVEN FOR REAL VALUES OF THE ARGUMENT TO ONE THAT IS DEFINED WHEN THE ARGUMENT IS COMPLEX FROM THERE ONE PROCEEDS TO THE MAIN PROPERTIES OF HOLOMORPHIC FUNCTIONS WHOSE PROOFS ARE GENERALLY SHORT AND QUITE ILLUMINATING THE CAUCHY THEOREMS RESIDUES ANALYTIC CONTINUATION THE ARGUMENT PRINCIPLE WITH THIS BACKGROUND THE READER IS READY TO LEARN A WEALTH OF ADDITIONAL MATERIAL CONNECTING THE SUBJECT WITH OTHER AREAS OF MATHEMATICS THE FOURIER TRANSFORM TREATED BY CONTOUR INTEGRATION THE ZETA FUNCTION AND THE PRIME NUMBER THEOREM AND AN INTRODUCTION TO ELLIPTIC FUNCTIONS CULMINATING IN THEIR APPLICATION TO COMBINATORICS AND NUMBER THEORY THOROUGHLY DEVELOPING A SUBJECT WITH MANY RAMIFICATIONS WHILE STRIKING A CAREFUL BALANCE BETWEEN CONCEPTUAL INSIGHTS AND THE TECHNICAL UNDERPINNINGS OF RIGOROUS ANALYSIS COMPLEX ANALYSIS WILL BE WELCOMED BY STUDENTS OF MATHEMATICS PHYSICS ENGINEERING AND OTHER SCIENCES THE PRINCETON LECTURES IN ANALYSIS REPRESENTS A SUSTAINED EFFORT TO INTRODUCE THE CORE AREAS OF MATHEMATICAL ANALYSIS WHILE ALSO ILLUSTRATING THE ORGANIC UNITY BETWEEN THEM NUMEROUS EXAMPLES AND APPLICATIONS THROUGHOUT ITS FOUR PLANNED VOLUMES OF WHICH COMPLEX ANALYSIS IS THE SECOND HIGHLIGHT THE FAR REACHING CONSEQUENCES OF CERTAIN IDEAS IN ANALYSIS TO OTHER FIELDS OF MATHEMATICS AND A VARIETY OF SCIENCES STEIN AND SHAKARCHI MOVE FROM AN INTRODUCTION ADDRESSING FOURIER SERIES AND INTEGRALS TO IN DEPTH CONSIDERATIONS OF COMPLEX ANALYSIS MEASURE AND INTEGRATION THEORY AND HILBERT SPACES AND FINALLY FURTHER TOPICS SUCH AS FUNCTIONAL ANALYSIS DISTRIBUTIONS AND ELEMENTS OF PROBABILITY THEORY

THIS TEXTBOOK INTRODUCES THE SUBJECT OF COMPLEX ANALYSIS TO ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS IN A CLEAR AND CONCISE MANNER KEY FEATURES OF THIS TEXTBOOK EFFECTIVELY ORGANIZES THE SUBJECT INTO EASILY MANAGEABLE SECTIONS IN THE FORM OF 50 CLASS TESTED LECTURES USES DETAILED EXAMPLES TO DRIVE THE PRESENTATION INCLUDES NUMEROUS EXERCISE SETS THAT ENCOURAGE PURSUING EXTENSIONS OF THE MATERIAL EACH WITH AN ANSWERS OR HINTS SECTION COVERS AN ARRAY OF ADVANCED TOPICS WHICH ALLOW FOR FLEXIBILITY IN DEVELOPING THE SUBJECT BEYOND THE BASICS PROVIDES A CONCISE HISTORY OF COMPLEX NUMBERS AN INTRODUCTION TO COMPLEX ANALYSIS WILL BE VALUABLE TO STUDENTS IN MATHEMATICS ENGINEERING AND OTHER APPLIED SCIENCES PREREQUISITES INCLUDE A COURSE IN CALCULUS

THIS BOOK IS INTENDED TO BE A SIMPLE AND EASY INTRODUCTION TO THE SUBJECT IT IS MEANT AS A TEXTBOOK FOR A COURSE IN COMPLEX ANALYSIS AT POSTGRADUATE LEVEL OF INDIAN UNIVERSITIES SOME OF THE WELCOME FEATURES OF THE BOOK ARE PROOFS AND MOTIVATION FOR THE THEORY EXAMPLES ARE PROVIDED TO ILLUSTRATE THE CONCEPTS EXERCISES OF VARIOUS LEVELS OF DIFFICULTY ARE GIVEN AT THE END OF EVERY CHAPTER KEEPING IN VIEW THE APPLIED NATURE OF THE SUBJECT ORDINARY LINEAR HOMOGENEOUS DIFFERENTIAL EQUATIONS OF THE SECOND ORDER AND CONFORMAL MAPPING AND ITS APPLICATIONS ARE GIVEN MORE ATTENTION THAN MOST OTHER BOOKS UNIFORM APPROXIMATION AND ELLIPTIC FUNCTIONS ARE TREATED IN GREAT DETAIL THERE IS ALSO A DETAILED TREATMENT OF HARMONIC FUNCTIONS WEIERSTRASS APPROXIMATION THEOREM ANALYTIC CONTINUATION RIEMANN MAPPING THEOREM HOMOLOGICAL VERSION OF CAUCHY'S THEOREM AND ITS APPLICATIONS DIAGRAMS ARE PROVIDED WHENEVER FEASIBLE TO HELP THE READER DEVELOP SKILL IN USING IMAGINATION TO VISUALISE ABSTRACT IDEAS SOLUTIONS TO SOME SELECTED EXERCISES WHICH INVOLVE LOT OF NEW IDEAS AND THEORETICAL CONSIDERATIONS HAVE BEEN PROVIDED AT THE END

ALL MODERN INTRODUCTIONS TO COMPLEX ANALYSIS FOLLOW MORE OR LESS EXPLICITLY THE PATTERN LAID DOWN IN WHITTAKER AND WATSON 75 IN PART I WE FIND THE FOUNDATIONAL MATERIAL THE BASIC DEFINITIONS AND THEOREMS IN PART II WE FIND THE EXAMPLES AND APPLICATIONS SLOWLY WE BEGIN TO UNDERSTAND WHY WE READ PART I HISTORICALLY THIS IS AN ANACHRONISM PEDAGOGICALLY IT IS A DISASTER PART II IN FACT PREDATES PART I SO CLEARLY IT CAN BE TAUGHT FIRST WHY SHOULD THE STUDENT HAVE TO WADE THROUGH HUNDREDS OF PAGES BEFORE FINDING OUT WHAT THE SUBJECT IS GOOD FOR IN TEACHING COMPLEX ANALYSIS THIS WAY WE RISK MORE THAN JUST BOREDOM BEGINNING WITH A SERIES OF UNMOTIVATED DEFINITIONS GIVES A MISLEADING IMPRESSION OF COMPLEX ANALYSIS IN PARTICULAR AND OF MATHEMATICS IN GENERAL THE CLASSICAL THEORY OF ANALYTIC FUNCTIONS DID NOT ARISE FROM THE IDLE SPECULATION OF BORED MATHEMATICIANS ON THE POSSIBLE CONSEQUENCES OF AN ARBITRARY SET OF DEFINITIONS IT WAS THE NATURAL EVEN INEVITABLE CONSEQUENCE OF THE PRACTICAL NEED TO ANSWER QUESTIONS ABOUT SPECIFIC EXAMPLES IN STANDARD TEXTS AFTER HUNDREDS OF PAGES OF THEOREMS ABOUT GENERIC ANALYTIC FUNCTIONS WITH ONLY THE RATIONAL AND TRIGONOMETRIC FUNCTIONS AS EXAMPLES STUDENTS INEVITABLY BEGIN TO BELIEVE THAT THE PURPOSE OF COMPLEX ANALYSIS IS TO PRODUCE MORE SUCH THEOREMS WE REQUIRE

INTRODUCTORY COM PLEX ANALYSIS COURSES OF OUR UNDERGRADUATES AND GRADUATES BECAUSE IT IS USEFUL BOTH WITHIN MATHEMATICS AND BEYOND

ALL THE EXERCISES PLUS THEIR SOLUTIONS FOR SERGE LANG S FOURTH EDITION OF COMPLEX ANALYSIS ISBN 0 387 98592 1 THE PROBLEMS IN THE FIRST 8 CHAPTERS ARE SUITABLE FOR AN INTRODUCTORY COURSE AT UNDERGRADUATE LEVEL AND COVER POWER SERIES CAUCHY S THEOREM LAURENT SERIES SINGULARITIES AND MEROMORPHIC FUNCTIONS THE CALCULUS OF RESIDUES CONFORMAL MAPPINGS AND HARMONIC FUNCTIONS THE MATERIAL IN THE REMAINING 8 CHAPTERS IS MORE ADVANCED WITH PROBLEMS ON SCHWARTZ REFLECTION ANALYTIC CONTINUATION JENSEN S FORMULA THE PHRAGMEN LINDELOEF THEOREM ENTIRE FUNCTIONS WEIERSTRASS PRODUCTS AND MEROMORPHIC FUNCTIONS THE GAMMA FUNCTION AND ZETA FUNCTION ALSO BENEFICIAL FOR ANYONE INTERESTED IN LEARNING COMPLEX ANALYSIS

RIGHT HERE, WE HAVE COUNTLESS EBOOK **FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS** AND COLLECTIONS TO CHECK OUT. WE ADDITIONALLY MEET THE EXPENSE OF VARIANT TYPES AND WITH TYPE OF THE BOOKS TO BROWSE. THE GOOD ENOUGH BOOK, FICTION, HISTORY, NOVEL, SCIENTIFIC RESEARCH, AS WITH EASE AS VARIOUS ADDITIONAL SORTS OF BOOKS ARE READILY OPEN HERE. AS THIS FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS, IT ENDS HAPPENING MAMMAL ONE OF THE FAVORED BOOKS FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS COLLECTIONS THAT WE HAVE. THIS IS WHY YOU REMAIN IN THE BEST WEBSITE TO SEE THE UNBELIEVABLE BOOK TO HAVE.

1. WHERE CAN I BUY FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS BOOKS? BOOKSTORES: PHYSICAL BOOKSTORES LIKE BARNES & NOBLE, WATERSTONES, AND INDEPENDENT LOCAL STORES. ONLINE RETAILERS: AMAZON, BOOK DEPOSITORY, AND VARIOUS ONLINE BOOKSTORES OFFER A WIDE RANGE OF BOOKS IN PHYSICAL AND DIGITAL FORMATS.
2. WHAT ARE THE DIFFERENT BOOK FORMATS AVAILABLE? HARDCOVER: STURDY AND DURABLE, USUALLY MORE EXPENSIVE. PAPERBACK: CHEAPER, LIGHTER, AND MORE PORTABLE THAN HARDCOVERS. E-BOOKS: DIGITAL BOOKS AVAILABLE FOR E-READERS LIKE KINDLE OR SOFTWARE LIKE APPLE BOOKS, KINDLE, AND GOOGLE PLAY BOOKS.
3. HOW DO I CHOOSE A FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS BOOK TO READ? GENRES: CONSIDER THE GENRE YOU ENJOY (FICTION, NON-FICTION, MYSTERY, SCI-FI, ETC.). RECOMMENDATIONS: ASK FRIENDS,

- JOIN BOOK CLUBS, OR EXPLORE ONLINE REVIEWS AND RECOMMENDATIONS. AUTHOR: IF YOU LIKE A PARTICULAR AUTHOR, YOU MIGHT ENJOY MORE OF THEIR WORK.
4. HOW DO I TAKE CARE OF FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS BOOKS? STORAGE: KEEP THEM AWAY FROM DIRECT SUNLIGHT AND IN A DRY ENVIRONMENT. HANDLING: AVOID FOLDING PAGES, USE BOOKMARKS, AND HANDLE THEM WITH CLEAN HANDS. CLEANING: GENTLY DUST THE COVERS AND PAGES OCCASIONALLY.
 5. CAN I BORROW BOOKS WITHOUT BUYING THEM? PUBLIC LIBRARIES: LOCAL LIBRARIES OFFER A WIDE RANGE OF BOOKS FOR BORROWING. BOOK SWAPS: COMMUNITY BOOK EXCHANGES OR ONLINE PLATFORMS WHERE PEOPLE EXCHANGE BOOKS.
 6. HOW CAN I TRACK MY READING PROGRESS OR MANAGE MY BOOK COLLECTION? BOOK TRACKING APPS: GOODREADS, LIBRARYTHING, AND BOOK CATALOGUE ARE POPULAR APPS FOR TRACKING YOUR READING PROGRESS AND MANAGING BOOK COLLECTIONS. SPREADSHEETS: YOU CAN CREATE YOUR OWN SPREADSHEET TO TRACK BOOKS READ, RATINGS, AND OTHER DETAILS.
 7. WHAT ARE FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS AUDIOBOOKS, AND WHERE CAN I FIND THEM? AUDIOBOOKS: AUDIO RECORDINGS OF BOOKS, PERFECT FOR LISTENING WHILE COMMUTING OR MULTITASKING. PLATFORMS: AUDIBLE, LIBRIVOX, AND GOOGLE PLAY BOOKS OFFER A WIDE SELECTION OF AUDIOBOOKS.
 8. HOW DO I SUPPORT AUTHORS OR THE BOOK INDUSTRY? BUY BOOKS: PURCHASE BOOKS FROM AUTHORS OR INDEPENDENT BOOKSTORES. REVIEWS: LEAVE REVIEWS ON PLATFORMS LIKE GOODREADS OR AMAZON. PROMOTION: SHARE YOUR FAVORITE BOOKS ON SOCIAL MEDIA

- OR RECOMMEND THEM TO FRIENDS.
9. ARE THERE BOOK CLUBS OR READING COMMUNITIES I CAN JOIN? LOCAL CLUBS: CHECK FOR LOCAL BOOK CLUBS IN LIBRARIES OR COMMUNITY CENTERS. ONLINE COMMUNITIES: PLATFORMS LIKE GOODREADS HAVE VIRTUAL BOOK CLUBS AND DISCUSSION GROUPS.
 10. CAN I READ FUNDAMENTALS OF COMPLEX ANALYSIS SOLUTIONS BOOKS FOR FREE? PUBLIC DOMAIN BOOKS: MANY CLASSIC BOOKS ARE AVAILABLE FOR FREE AS THEYRE IN THE PUBLIC DOMAIN. FREE E-BOOKS: SOME WEBSITES OFFER FREE E-BOOKS LEGALLY, LIKE PROJECT GUTENBERG OR OPEN LIBRARY.

INTRODUCTION

THE DIGITAL AGE HAS REVOLUTIONIZED THE WAY WE READ, MAKING BOOKS MORE ACCESSIBLE THAN EVER. WITH THE RISE OF EBOOKS, READERS CAN NOW CARRY ENTIRE LIBRARIES IN THEIR POCKETS. AMONG THE VARIOUS SOURCES FOR EBOOKS, FREE EBOOK SITES HAVE EMERGED AS A POPULAR CHOICE. THESE SITES OFFER A TREASURE TROVE OF KNOWLEDGE AND ENTERTAINMENT WITHOUT THE COST. BUT WHAT MAKES THESE SITES SO VALUABLE, AND WHERE CAN YOU FIND THE BEST ONES? LET’S DIVE INTO THE WORLD OF FREE EBOOK SITES.

BENEFITS OF FREE EBOOK SITES

WHEN IT COMES TO READING, FREE EBOOK SITES OFFER NUMEROUS ADVANTAGES.

COST SAVINGS

FIRST AND FOREMOST, THEY SAVE

YOU MONEY. BUYING BOOKS CAN BE EXPENSIVE, ESPECIALLY IF YOU’RE AN AVID READER. FREE EBOOK SITES ALLOW YOU TO ACCESS A VAST ARRAY OF BOOKS WITHOUT SPENDING A DIME.

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THERE ARE COUNTLESS FREE EBOOK SITES, BUT A FEW STAND OUT FOR THEIR QUALITY AND RANGE OF OFFERINGS.

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