Solution To A Polynomial Equation

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Solving Polynomial Systems Using Continuation for Engineering and Scientific Problems Springer Science & Business Media
The solution of a polynomial equation f(x) = 0 (f will henceforth refer only to a polynomial) by an iterative method generally requires the finding of an initial approximation to the root of the polynomial equation (or the zero of the polynomial f(x); the terms 'root' and 'zero' will be used interchangeably), sometimes referred to as the 'first guess, ' and then utilizing an iteration function phi to iterate to an 'acceptable' solution of the equation. The function phi is usually exhibited in 'canonical form', that is, it is of the form which allows the calculation of each successive iterant by applying a small correction to the preceding iterant. (Author).

Construction of globally convergent iteration functions for the solution of polynomial equations by the method of Traub Springer Science & Business Media
In this book I have given an algorithm which works for quadratic equation, cubic equation, quartic equation, quintic equation, ..., to n^th degree polynomial equation. You can solve any degree polynomial equation by this algorithm. In this book I have given an exercise depending on quadratic equation, an exercise depending on cubic equation, an exercise depending on quartic equation, an exercise depending on quintic equation and an exercise depending on higher degree polynomial equation to the practice of this algorithm. I have inserted most important questions of quadratic equation, most important questions of cubic equation, most important questions of quartic equation, most important questions of quintic equation and also most important questions of higher than five degree polynomial equation such that your practice be perfect. Polynomial equation is most important for high school student, college, university, all entrance examinations, teachers, competitions, B.A., B.Sc., B.Teck., M.A., M.Sc., M.Teck., Ph.d. I hope this book be a panacea for all the readers of this book .This book is most important for all the branches of science and mathematics.Polynomial equations are used in the following branchesAlgebra, Trigonometry, Calculus, Geometry, Number Theory, Topology, Combinatorics, Applied Mathematics, Dynamical Systems and Differential Equations, Mathematical Physics, Computation, Information Theory and Signal Processing, Probability and Statistics and more.

Randomization, Relaxation, and Complexity in Polynomial Equation Solving CRC Press
Primarily a textbook to prepare Sixth Form students for public examinations in Hong Kong, this book is also useful as a reference for undergraduate students since it contains some advanced theory of equations beyond the sixth form level.

How to solve polynomial equations Cambridge University Press
The subject of this book is the solution of polynomial equations, that is, s- tems of (generally) non-linear algebraic equations. This study is at the heart of several areas of mathematics and its applications. It has provided the - tivation for advances in di?erent branches of mathematics such as algebra, geometry, topology, and numerical analysis. In recent years, an explosive - velopment of algorithms and software has made it possible to solve many problems which had been intractable up to then and greatly expanded the areas of applications to include robotics, machine vision, signal processing, structural molecular biology, computer-aided design and geometric modelling, as well as certain areas of statistics, optimization and game theory, and b- logical networks. At the same time, symbolic computation has proved to be an invaluable tool for experimentation and conjecture in pure mathematics. As a consequence, the interest in e?ective algebraic geometry and computer algebrahasextendedwellbeyonditsoriginalconstituencyofpureandapplied mathematicians and computer scientists, to encompass many other scientists and engineers. While the core of the subject remains algebraic geometry, it also calls upon many other aspects of mathematics and theoretical computer science, ranging from numerical methods, di?erential equations and number theory to discrete geometry, combinatorics and complexity theory.
Thegoalofthisbookistoprovideageneralintroduction tomodernma- ematical aspects in computing with multivariate polynomials and in solving algebraic systems.

Solving Polynomial Equations CRC Press
Simple computational methods are given for solving a large class of nonlinear equations of polynomial type. (Author).

Numerically Solving Polynomial Systems with Bertini Hong Kong University Press
Polynomial operators are a natural generalization of linear operators. Equations in such operators are the linear space analog of ordinary polynomials in one or several variables over the fields of real or complex numbers. Such equations encompass a broad spectrum of applied problems including all linear equations. Often the polynomial nature of many nonlinear problems goes unrecognized by researchers. This is more likely due to the fact that polynomial operators - unlike polynomials in a single variable - have received little attention. Consequently, this comprehensive presentation is needed, benefiting those working in the field as well as those seeking information about specific results or techniques. Polynomial Operator Equations in Abstract Spaces and Applications - an outgrowth of fifteen years of the author's research work - presents new and traditional results about polynomial equations as well as analyzes current iterative methods for their numerical solution in various general space settings. Topics include: Special cases of nonlinear operator equations Solution of polynomial operator equations of positive integer degree n Results on global existence theorems not related with contractions Galois theory Polynomial integral and polynomial differential equations appearing in radiative transfer, heat transfer, neutron transport, electromechanical networks, elasticity, and other areas Results on the various Chandrasekhar equations Weierstrass theorem Matrix representations Lagrange and Hermite interpolation Bounds of polynomial equations in Banach space, Banach algebra, and Hilbert space The materials discussed can be used for the following studies Advanced numerical analysis Numerical functional analysis Functional analysis Approximation theory Integral and differential equation

Adaptive Strategy for the Solution of Polynomial Equations Courier Corporation
The quadratic formula for the solution of quadratic equations was discovered independently by scholars in many ancient cultures and is familiar to everyone. Less well known are formulas for solutions of cubic and quartic equations whose discovery was the high point of 16th century mathematics. Their study forms the heart of this book, as part of the broader theme that a polynomial's coefficients can be used to obtain detailed information on its roots. The book is designed for self-study, with many results presented as exercises and some supplemented by outlines for solution. The intended audience includes in-service and prospective secondary mathematics teachers, high school students eager to go beyond the standard curriculum, undergraduates who desire an in-depth look at a topic they may have unwittingly skipped over, and the mathematically curious who wish to do some work to unlock the mysteries of this beautiful subject.

American Mathematical Soc.
This book provides the first English translation of Bezout's masterpiece, the General Theory of Algebraic Equations. It follows, by almost two hundred years, the English translation of his famous mathematics textbooks. Here, Bézout presents his approach to solving systems of polynomial equations in several variables and in great detail. He introduces the revolutionary notion of the "polynomial multiplier," which greatly simplifies the problem of variable elimination by reducing it to a system of linear equations. The major result presented in this work, now known as "Bézout's theorem," is stated as follows: "The degree of the final equation resulting from an arbitrary number of complete equations containing the same number of unknowns and with arbitrary degrees is equal to the product of the exponents of the degrees of these equations." The book offers large numbers of results and insights about conditions for polynomials to share a common factor, or to share a common root. It also provides a state-of-the-art analysis of the theories of integration and differentiation of functions in the late eighteenth century, as well as one of the first uses of determinants to solve systems of linear equations. Polynomial multiplier methods have become, today, one of the most promising approaches to solving complex systems of polynomial equations or inequalities, and this translation offers a valuable historic perspective on this active research field.

Numerically Solving Polynomial Systems with Bertini Cambridge University Press
Working out solutions to polynomial equations is a mathematical problem that dates from antiquity. Galois developed a theory in which the obstacle to solving a polynomial equation is an associated collection of symmetries. Obtaining a root requires "breaking" that symmetry. When the degree of an equation is at least five, Galois Theory established that there is no formula for the solutions like those found in lower degree cases. However, this negative result doesn't mean that the practice of equation-solving ends. In a recent breakthrough, Doyle and McMullen devised a solution to the fifth-degree equation that uses geometry, algebra, and dynamics to exploit icosahedral symmetry. Polynomials, Dynamics, and Choice: The Price We Pay for Symmetry is organized in two parts, the first of which develops an account of polynomial symmetry that relies on considerations of algebra and geometry. The second explores beyond polynomials to spaces consisting of choices ranging from mundane decisions to evolutionary algorithms that search for optimal outcomes. The two algorithms in Part I provide frameworks that capture structural issues that can arise in deliberative settings. While decision-making has been approached in mathematical terms, the novelty here is in the use of equation-solving algorithms to illuminate such problems. Features Treats the topic—familiar to many—of solving polynomial equations in a way that's dramatically different from what they saw in school Accessible to a general audience with limited mathematical background Abundant diagrams and graphics.

Numerical Solution of Systems of Simultaneous Polynomial Equations Elsevier

Solving Polynomial EquationsSpringer Science & Business Media

On the Numerical Solution of Polynomial Equations Trafford Publishing
Topics include vector spaces and matrices; orthogonal functions; polynomial equations; asymptotic expansions; ordinary differential equations; conformal mapping; and extremum problems. Includes exercises and solutions. 1962 edition.

Three-stage Variable-shift Iterations for the Solution of Polynomial Equations with A? P?o?s?t?e?r?i?o?r?i? Error Bounds for the Zeros SIAM
The book extends the high school curriculum and provides a backdrop for later study in calculus, modern algebra, numerical analysis, and complex variable theory. Exercises introduce many techniques and topics in the theory of equations, such as evolution and factorization of polynomials, solution of equations, interpolation, approximation, and congruences. The theory is not treated formally, but rather illustrated through examples. Over 300 problems drawn from journals, contests, and examinations test understanding, ingenuity, and skill. Each chapter ends with a list of hints; there are answers to many of the exercises and solutions to all of the problems. In addition, 69 "explorations" invite the reader to investigate research problems and related topics.

Solving Systems of Polynomial Equations Springer Science & Business Media
Computational algebra; computational number theory; commutative algebra; handbook; reference; algorithmic; modern.

Intermediate Algebra SIAM
This volume corresponds to the Banff International Research Station Workshop on Randomization, Relaxation, and Complexity, held from February 28-March 5, 2010 in Banff, Alberta, Canada. This volume contains a sample of advanced algorithmic techniques underpinning the solution of systems of polynomial equations. The papers are written by leading experts in algorithmic algebraic geometry and touch upon core topics such as homotopy methods for approximating complex solutions, robust floating point methods for clusters of roots, and speed-ups for counting real solutions. Vital related topics such as circuit complexity, random polynomials over local fields, tropical geometry, and the theory of fewnomials, amoebae, and coamoebae are treated as well. Recent advances on Smale's 17th Problem, which deals with numerical algorithms that approximate a single complex solution in average-case polynomial time, are also surveyed.

Algebra for College Students American Mathematical Soc.
This book is devoted to the analysis of approximate solution techniques for differential equations, based on classical orthogonal polynomials.

These techniques are popularly known as spectral methods. In the last few decades, there has been a growing interest in this subject. As a matter offact, spectral methods provide a competitive alternative to other standard approximation techniques, for a large variety of problems. Initial ap plications were concerned with the investigation of periodic solutions of boundary value problems using trigonometric polynomials. Subsequently, the analysis was extended to algebraic polynomials. Expansions in orthogonal basis functions were preferred, due to their high accuracy and flexibility in computations. The aim of this book is to present a preliminary mathematical background for be ginners who wish to study and perform numerical experiments, or who wish to improve their skill in order to tackle more specific applications. In addition, it furnishes a com prehensive collection of basic formulas and theorems that are useful for implementations at any level of complexity. We tried to maintain an elementary exposition so that no experience in functional analysis is required.

The Solution of Polynomial Equations Using the Quotient-difference Method Solving Polynomial Equations

This book is a guide to concepts and practice in numerical algebraic geometry ? the solution of systems of polynomial equations by numerical methods. Through numerous examples, the authors show how to apply the well-received and widely used open-source Bertini software package to compute solutions, including a detailed manual on syntax and usage options. The authors also maintain a complementary web page where readers can find supplementary materials and Bertini input files. Numerically Solving Polynomial Systems with Bertini approaches numerical algebraic geometry from a user's point of view with numerous examples of how Bertini is applicable to polynomial systems. It treats the fundamental task of solving a given polynomial system and describes the latest advances in the field, including algorithms for intersecting and projecting algebraic sets, methods for treating singular sets, the nascent field of real numerical algebraic geometry, and applications to large polynomial systems arising from differential equations. Those who wish to solve polynomial systems can start gently by finding isolated solutions to small systems, advance rapidly to using algorithms for finding positive-dimensional solution sets (curves, surfaces, etc.), and learn how to use parallel computers on large problems. These techniques are of interest to engineers and scientists in fields where polynomial equations arise, including robotics, control theory, economics, physics, numerical PDEs, and computational chemistry.

The Fundamental Theorem of Algebra American Mathematical Soc.

College Algebra provides a comprehensive exploration of algebraic principles and meets scope and sequence requirements for a typical introductory algebra course. The modular approach and richness of content ensure that the book meets the needs of a variety of courses. College Algebra offers a wealth of examples with detailed, conceptual explanations, building a strong foundation in the material before asking students to apply what they've learned. Coverage and Scope In determining the concepts, skills, and topics to cover, we engaged dozens of highly experienced instructors with a range of student audiences. The resulting scope and sequence proceeds logically while allowing for a significant amount of flexibility in instruction. Chapters 1 and 2 provide both a review and foundation for study of Functions that begins in Chapter 3. The authors recognize that while some institutions may find this material a prerequisite, other institutions have told us that they have a cohort that need the prerequisite skills built into the course. Chapter 1: Prerequisites Chapter 2: Equations and Inequalities Chapters 3-6: The Algebraic Functions Chapter 3: Functions Chapter 4: Linear Functions Chapter 5: Polynomial and Rational Functions Chapter 6: Exponential and Logarithm Functions Chapters 7-9: Further Study in College Algebra Chapter 7: Systems of Equations and Inequalities Chapter 8: Analytic Geometry Chapter 9: Sequences, Probability and Counting Theory

Solving Polynomial Equation Systems I Springer Science & Business Media

Algebra for College Students, Revised and Expanded Edition is a complete and self-contained presentation of the fundamentals of algebra which has been designed for use by the student. The book provides sufficient materials for use in many courses in college algebra. It contains chapters that are devoted to various mathematical concepts, such as the real number system, sets and set notation, matrices and their application in solving linear systems, and notation of functions. The theory of polynomial equations, formulas for factoring a sum and a difference of cubes, roots of polynomials, and the geometric definition of each conic are likewise included in the book. College students will find the book very useful and invaluable.

Computational Methods for Abstract Polynomial Equations Princeton University Press

The fundamental theorem of algebra states that any complex polynomial must have a complex root. This book examines three pairs of proofs of the theorem from three different areas of mathematics: abstract algebra, complex analysis and topology. The first proof in each pair is fairly straightforward and depends only on what could be considered elementary mathematics. However, each of these first proofs leads to more general results from which the fundamental theorem can be deduced as a direct consequence. These general results constitute the second proof in each pair. To arrive at each of the proofs, enough of the general theory of each relevant area is developed to understand the proof. In addition to the proofs and techniques themselves, many applications such as the insolvability of the quintic and the transcendence of e and pi are presented. Finally, a series of appendices give six additional proofs including a version of Gauss'original first proof. The book is intended for junior/senior level undergraduate mathematics students or first year graduate students, and would make an ideal "capstone" course in mathematics.

Polynomial Approximation of Differential Equations Cambridge University Press

A classic problem in mathematics is solving systems of polynomial equations in several unknowns. Today, polynomial models are ubiquitous and widely used across the sciences. They arise in robotics, coding theory, optimization, mathematical biology, computer vision, game theory, statistics, and numerous other areas. This book furnishes a bridge across mathematical disciplines and exposes many facets of systems of polynomial equations. It covers a wide spectrum of mathematical techniques and algorithms, both symbolic and numerical.The set of solutions to a system of polynomial equations is an algebraic variety - the basic object of algebraic geometry. The algorithmic study of algebraic varieties is the central theme of computational algebraic geometry. Exciting recent developments in computer software for geometric calculations have revolutionized the field. Formerly inaccessible problems are now tractable, providing fertile ground for experimentation and conjecture. The first half of the book gives a snapshot of the state of the art of the topic. Familiar themes are covered in the first five chapters, including polynomials in one variable, Grobner bases of zero-dimensional ideals, Newton polytopes and Bernstein's Theorem, multidimensional resultants, and primary decomposition.The second half of the book explores polynomial equations from a variety of novel and unexpected angles. It introduces interdisciplinary connections, discusses highlights of current research, and outlines possible future algorithms. Topics include computation of Nash equilibria in game theory, semidefinite programming and the real Nullstellensatz, the algebraic geometry of statistical models, the piecewise-linear geometry of valuations and amoebas, and the Ehrenpreis-Palamodov theorem on linear partial differential equations with constant coefficients.Throughout the text, there are many hands-on examples and exercises, including short but complete sessions in MapleR, MATLABR, Macaulay 2, Singular, PHCpack, CoCoA, and SOSTools software. These examples will be particularly useful for readers with no background in algebraic geometry or commutative algebra. Within minutes, readers can learn how to type in polynomial equations and actually see some meaningful results on their computer screens. Prerequisites include basic abstract and computational algebra. The book is designed as a text for a graduate course in computational algebra.