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The Body Fluids and Their Functions **Mathematical Functions and Their Approximations** **Elliptic Curves, Modular Forms, and Their L-functions** **The Body System Series** **Identification of a Novel Family of Cysteine Proteases and Their Functions in Bacterial Pathogenesis** Discovering the Brain **Structures and Their Functions in Usan** **The Tabernacle, the Priesthood and Their Functions** *Introduction to P-Adic Numbers and Their Functions* *Molecular Biology of the Cell* **Multiple Zeta Functions, Multiple Polylogarithms and Their Special Values** **The Brain and Its Functions** *Special Functions and Their Approximations:* **The Effects of Food Processing on Food Components and Their Health Functions, Volume II** Investigating and harnessing T-cell functions with engineered immune receptors and their ligands **Inequalities Involving Functions and Their Integrals and Derivatives** **Convex Functions and Their Applications** Bessel Functions and Their Applications Convex Functions and their Applications Tau Functions and their Applications *SOC Functions and Their Applications* *Public Affairs Offices and Their Functions* **Generalized Functions and Their Applications** *Bessel Functions and Their Applications* *Functions of Several Complex Variables and Their Singularities* Hypergeometric Functions and Their Applications **Asymptotic Characteristics of Entire Functions and Their Applications in Mathematics and Biophysics** *Window Functions and Their Applications in Signal*

Processing Functions of Bounded Variation and Their Fourier Transforms **Generalized Associated Legendre Functions and Their Applications** *Sums of Exponential Functions and Their New Fundamental Properties, with Applications to Natural Phenomena* **Spectral Theory of Operator Pencils, Hermite-Biehler Functions, and their Applications** *On Riemann's Theory of Algebraic Functions and Their Integrals* **Mathieu Functions and Spheroidal Functions and their Mathematical Foundations** Graphs and Tables of the Mathieu Functions and Their First Derivatives **Recent Advances in Orthogonal Polynomials, Special Functions, and Their Applications Run Related Probability Functions and their Application to Industrial Statistics** Differential Forms Orthogonal to Holomorphic Functions Or Forms, and Their Properties *Tables of the Bessel-Kelvin Functions Ber, Bei, Ker, Kei, and Their Derivatives for the Argument Range 0(0.01)107.50* *An Introduction to Symmetric Functions and Their Combinatorics*

Bessel functions are associated with a wide range of problems in important areas of mathematical physics. Bessel function theory is applied to problems of acoustics, radio physics, hydrodynamics, and atomic and nuclear physics. Bessel Functions and Their Applications consists of two parts. In Part One, the author presents a clear and rigorous intro This book covers all of the concepts required to tackle second-order cone programs (SOCPs), in order to provide the reader a complete picture of SOC functions and their applications. SOCPs have attracted considerable attention, due to their wide range of applications in engineering, data science, and finance. To deal with this special group of optimization problems involving second-order cones (SOCs), we most often need to employ the following crucial concepts: (i) spectral decomposition associated with SOCs, (ii) analysis of SOC functions, and (iii) SOC-convexity and -monotonicity. Moreover, we can roughly classify the related algorithms into two categories. One category includes traditional algorithms that do not use complementarity functions. Here, SOC-convexity and SOC-monotonicity play a key role. In contrast, complementarity functions are employed for the other category. In this context, complementarity functions are closely related to SOC functions; consequently, the analysis of SOC functions can help with these algorithms. The Body System Series: The Complete Body System Series and Their Functions Having trouble on Biology? Need to find out information about the organ systems and how they work?. This book contains the five different body systems, plus, three more body systems. This is an excellent book if you need, or want; to learn about all the systems of the human body in one go. In this book it contains information on: 1. The Digestive System 2. The Respiratory System 3. The Circulatory/Cardiovascular System 4. The Immune System 5. The Renal System Plus 1. The Endocrine System 2. The Nervous System 3. The Reproductive Syste Mathieu functions are employed in solving a variety of problems in mathematic (al?) physics. In many cases the configuration involves elliptical coordinates. Of course, the circular geometry is the degenerate case of the elliptical cross section. This volume contains values for, and curves of the angular and radial Mathieu functions and their first derivatives. The latter are often needed in the solution of problems, in particular in solving electromagnetic wave propagation problems. Also included are data on zero crossings of the radial Mathieu functions. These are often needed for determining the cut-off frequencies for propagating modes. Other tables are available for the Mathieu functions, but there is very little data available for derivatives or zero crossings. It is felt that the principal value of this volume is in the multitude of curves included. The analyst dealing with elliptical cases can, by inspection of the curves, find values of the functions and derivatives at the origin, maxima and minima, zero crossings, and qualitative behavior of the plots as a function of several parameters. To the authors knowledge, this is the most extensive presentation of plotted information. It is hoped that the information will be helpful in the solution of practical problems. This book is divided into two sections. Section I deals only with the functions themselves, defining the equations and terminology used and presenting the tabular data and curves. Section II treats the derivatives and the zeros. Again the terminology and equations for the first derivatives are given. The Mathieu functions are named after Emile L. Mathieu (1835-1890), a French mathematician, who in 1868 published an article dealing with vibratory movement of the elliptic membrane. The asteroid 27947 Emilemathieu is named in his honor. Special Functions and Their Approximations: v. 2 A great researcher, writer, and teacher in an era of tremendous mathematical ferment, Felix Klein (1849–1925) occupies a prominent place in the history of mathematics. His many talents included an ability to express complicated mathematical ideas directly and comprehensively, and this book, a consideration of the investigations in the first part of Riemann's Theory of Abelian Functions, is a prime example of his expository powers. The treatment introduces Riemann's approach to multiple-value functions and the geometrical representation of these functions by what later became known as Riemann surfaces. It further concentrates on the kinds of functions that can be defined on these surfaces, confining the treatment to rational functions and their integrals. The text then demonstrates how Riemann's mathematical ideas about Abelian integrals can be arrived at by thinking in terms of the flow of electric current on surfaces. Klein's primary concern is preserving the sequence of thought and offering intuitive explanations of Riemann's notions, rather than furnishing detailed proofs. Deeply significant in the area of complex functions, this work constitutes one of the best introductions to the origins of topological problems. The various types of special functions have become essential tools for scientists and engineers. One of the important classes of special functions is of the hypergeometric type. It includes all classical hypergeometric functions such as the well-known Gaussian hypergeometric functions, the Bessel, Macdonald, Legendre, Whittaker, Kummer, Tricomi and Wright functions, the generalized hypergeometric functions ?Fq, Meijer's G-function, Fox's H-function, etc.Application of the new special functions allows one to increase considerably the number of problems whose solutions are found in a closed form, to examine these solutions, and to investigate the relationships between different classes of the special functions.This book deals with the theory and applications of generalized associated Legendre functions of the first and the second kind, Pm, n?(z) and Qm, n?(z), which are important representatives of the hypergeometric functions. They occur as generalizations of classical Legendre functions of the first and the second kind respectively. The authors use various methods of contour integration to obtain important properties of the generalized associated Legnedre functions as their series representations, asymptotic formulas in a neighborhood of singular points, zero properties, connection with Jacobi functions, Bessel functions, elliptic integrals and incomplete beta functions.The book also presents the theory of factorization and composition structure of integral operators associated with the generalized associated Legendre function, the fractional integro-differential properties of the functions Pm, n?(z) and Qm, n?(z), the classes of dual and triple integral equations associated with the function Pm, n-1/2+i?(chà) etc. The International Symposium on Generalized Functions and Their Applications was organized by the Department of Mathematics, Banaras Hindu University, and held December 23-26, 1991, on the occasion of the Platinum Jubilee Celebration of the university. More than a hundred mathematicians from ten countries participated in the deliberations of the symposium. Thirty lectures were delivered on a variety of topics within the area. The contributions to the proceedings of the symposium are, with a few exceptions, expanded versions of the lectures delivered by the invited speakers. The survey papers by Komatsu and Hoskins and Sousa Pinto provide an up-to-date account of the theory of hyperfunctions, ultradistributions and microfunctions, and the nonstandard theory of new generalized functions, respectively; those by Stankovic and Kanwal deal with structures and asymptotics. Choquet-Bruhat's work studies generalized functions on manifold and gives applications to shocks and discrete models. The other contributions relate to contemporary problems and achievements in theory and applications, especially in the theory of partial differential equations, differential geometry, mechanics, mathematical physics, and systems science. The proceedings give a very clear impression of the present state of the art in this field and contain many challenges, ideas, and open problems. The volume is very helpful for a broad spectrum of readers: graduate students to mathematical researchers. Usan is a Papuan language. In this monograph on the grammatical structures of Usan and their function the author shows the unique features of this language: how speakers can exploit certain principles for communicative purposes, how the language reflects their physical environment. Uniqueness can only be shown in the context of communality with other languages. This monograph offers numerous occasions to observe similarities and differences between Usan and other language, those that can be called Papuan in particular. Many problems in number theory have simple statements, but their solutions require a deep understanding of algebra, algebraic geometry, complex analysis, group representations, or a combination of all four. The original simply stated problem can be obscured in the depth of the theory developed to understand it. This book is an introduction to some of these problems, and an overview of the theories used nowadays to attack them, presented so that the number theory is always at the forefront of the discussion. Lozano-Robledo gives an introductory survey of elliptic curves, modular forms, and L-

functions. His main goal is to provide the reader with the big picture of the surprising connections among these three families of mathematical objects and their meaning for number theory. As a case in point, Lozano-Robledo explains the modularity theorem and its famous consequence, Fermat's Last Theorem. He also discusses the Birch and Swinnerton-Dyer Conjecture and other modern conjectures. The book begins with some motivating problems and includes numerous concrete examples throughout the text, often involving actual numbers, such as 3, 4, 5, $\frac{3344161}{747348}$, and $\frac{22440351770433696992455751309066748631609484720 41} {8912332268928859588025535178967163570016480830}$. The theories of elliptic curves, modular forms, and L-functions are too vast to be covered in a single volume, and their proofs are outside the scope of the undergraduate curriculum. However, the primary objects of study, the statements of the main theorems, and their corollaries are within the grasp of advanced undergraduates. This book concentrates on motivating the definitions, explaining the statements of the theorems and conjectures, making connections, and providing lots of examples, rather than dwelling on the hard proofs. The book succeeds if, after reading the text, students feel compelled to study elliptic curves and modular forms in all their glory. Mathematics is playing an ever more important role in the physical and biological sciences, provoking a blurring of boundaries between scientific disciplines and a resurgence of interest in the modern as well as the clas sical techniques of applied mathematics. This renewal of interest, both in research and teaching, has led to the establishment of the series: Texts in Applied Mathematics (TAM). The development of new courses is a natural consequence of a high level of excitement on the research frontier as newer techniques, such as numerical and symbolic computer systems, dynamical systems, and chaos, mix with and reinforce the traditional methods of applied mathematics. Thus, the purpose of this textbook series is to meet the current and future needs of these advances and encourage the teaching of new courses. TAM will publish textbooks suitable for use in advanced undergraduate and beginning graduate courses, and will complement the Applied Mathe matical Sciences (AMS) series, which will focus on advanced textbooks and research level monographs. Preface A wide range of problems exists in classical and quantum physics, engi neering, and applied mathematics in which special functions arise. The procedure followed in most texts on these topics (e. g. , quantum mechanics, electrodynamics, modern physics, classical mechanics, etc.) is to formu late the problem as a differential equation that is related to one of several special differential equations (Hermite's, Bessel's, Laguerre's, Legendre's, etc.). The theoretical part of this monograph examines the distribution of the spectrum of operator polynomials, focusing on quadratic operator polynomials with discrete spectra. The second part is devoted to applications. Standard spectral problems in Hilbert spaces are of the form A-λI for an operator A, and self-adjoint operators are of particular interest and importance, both theoretically and in terms of applications. A characteristic feature of self-adjoint operators is that their spectra are real, and many spectral problems in theoretical physics and engineering can be described by using them. However, a large class of problems, in particular vibration problems with boundary conditions depending on the spectral parameter, are represented by operator polynomials that are quadratic in the eigenvalue parameter and whose coefficients are self-adjoint operators. The spectra of such operator polynomials are in general no more real, but still exhibit certain patterns. The distribution of these spectra is the main focus of the present volume. For some classes of quadratic operator polynomials, inverse problems are also considered. The connection between the spectra of such quadratic operator polynomials and generalized Hermite-Biehler functions is discussed in detail. Many applications are thoroughly investigated, such as the Regge problem and damped vibrations of smooth strings, Stieltjes strings, beams, star graphs of strings and quantum graphs. Some chapters summarize advanced background material, which is supplemented with detailed proofs. With regard to the reader’s background knowledge, only the basic properties of operators in Hilbert spaces and well-known results from complex analysis are assumed. Shestopaloff proves new fundamental properties of sums of exponential functions and illustrates application of these properties to different kinds of natural phenomena, particularly applications in biology. T-cells are an essential component of the immune system that provide protection against pathogen infections and cancer and are involved in the aetiology of numerous autoimmune and autoinflammatory pathologies. Their importance in disease, the relative ease to isolate, expand and manipulate them ex vivo have put T-cells at the forefront of basic and translational research in immunology. Decades of study have shed some light on the unique way T-cells integrate extrinsic environmental cues influencing an activation program triggered by interactions between peptide-MHC complexes and the antigen-recognition machinery constituted of clonally distributed T-cell receptors and their co-receptor CD4 or CD8. The manipulation of these molecular determinants in cellular systems or as recombinant proteins has considerably enhanced our ability to understand antigen-specific T-cell activation, to monitor ongoing T-cell responses and to exploit T-cells for therapy. Even though these principles have given numerous insights in the biology of CD8+ T-cells that translate into promising therapeutic prospects, as illustrated by recent breakthroughs in cancer therapy, they have proven more challenging to apply to CD4+ T-cells. This Research Topic aims to provide a comprehensive view of the recent insights provided by the use of engineered antigen receptors and their ligands on T-cell activation and how they have been or could be harnessed to design efficient immunotherapies. The book provides an introduction to the theory of functions of several complex variables and their singularities, with special emphasis on topological aspects. The topics include Riemann surfaces, holomorphic functions of several variables, classification and deformation of singularities, fundamentals of differential topology, and the topology of singularities. The aim of the book is to guide the reader from the fundamentals to more advanced topics of recent research. All the necessary prerequisites are specified and carefully explained. The general theory is illustrated by various examples and applications. Functions of bounded variation represent an important class of functions. Studying their Fourier transforms is a valuable means of revealing their analytic properties. Moreover, it brings to light new interrelations between these functions and the real Hardy space and, correspondingly, between the Fourier transform and the Hilbert transform. This book is divided into two major parts, the first of which addresses several aspects of the behavior of the Fourier transform of a function of bounded variation in dimension one. In turn, the second part examines the Fourier transforms of multivariate functions with bounded Hardy variation. The results obtained are subsequently applicable to problems in approximation theory, summability of the Fourier series and integrability of trigonometric series. The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. This volume contains the proceedings of the 11th International Symposium on Orthogonal Polynomials, Special Functions, and their Applications, held August 29-September 2, 2011, at the Universidad Carlos III de Madrid in Leganes, Spain. The papers cover asymptotic properties of polynomials on curves of the complex plane, universality behavior of sequences of orthogonal polynomials for large classes of measures and its application in random matrix theory, the Riemann-Hilbert approach in the study of Pade approximation and asymptotics of orthogonal polynomials, quantum walks and CMV matrices, spectral modifications of linear functionals and their effect on the associated orthogonal polynomials, bivariate orthogonal polynomials, and optimal Riesz and logarithmic energy distribution of points. The methods used include potential theory, boundary values of analytic functions, Riemann-Hilbert analysis, and the steepest descent method. The authors consider the problem of characterizing the exterior differential forms which are orthogonal to holomorphic functions (or forms) in a domain $D\subset {\mathbf C}^n$ with respect to integration over the boundary, and some related questions. They give a detailed account of the derivation of the Bochner-Martinelli-Koppelman integral representation of exterior differential forms, which was obtained in 1967 and has already found many important applications. They study the properties of $\overline \partial$-closed forms of type $(p, n - 1), 0\leq p\leq n - 1$, which turn out to be the duals (with respect to the orthogonality mentioned above) to holomorphic functions (or forms) in several complex variables, and resemble holomorphic functions of one complex variable in their properties. The brain ... There is no other part of the human anatomy that is so intriguing. How does it develop and function and why does it sometimes, tragically, degenerate? The answers are complex. In Discovering the Brain, science writer Sandra Ackerman cuts through the complexity to bring this vital topic to the public. The 1990s were declared the "Decade of the Brain" by former President Bush, and the neuroscience community responded with a host of new investigations and conferences. Discovering the Brain is based on the Institute of Medicine conference, Decade of the Brain: Frontiers in Neuroscience and Brain Research. Discovering the Brain is a "field guide" to the brainâ€"an easy-to-read discussion of the brain's physical structure and where functions such as language and music appreciation lie. Ackerman examines: How electrical and chemical signals are conveyed in the brain. The mechanisms by which we see, hear, think, and pay attentionâ€"and how a "gut feeling" actually originates in the brain. Learning and memory retention, including parallels to computer memory and what they might tell us about our own mental capacity. Development of the brain throughout the life span, with a look at the aging brain. Ackerman provides an enlightening chapter on the connection between the brain's physical condition and various mental disorders and notes what progress can realistically be made toward the prevention and treatment of stroke and other ailments. Finally, she explores the potential for major advances during the "Decade of the Brain," with a look at medical imaging techniquesâ€"what various technologies can and cannot tell usâ€"and how the public and private sectors can contribute to continued advances in neuroscience. This highly readable volume will provide the public and policymakersâ€"and many scientists as wellâ€"with a helpful guide to understanding the many discoveries that are sure to be announced throughout the "Decade of the Brain." This book is a reader-friendly introduction to the theory of symmetric functions, and it includes fundamental topics such as the monomial, elementary, homogeneous, and Schur function bases; the skew Schur functions; the Jacobi–Trudi identities; the involution ω ω; the Hall inner product; Cauchy's formula; the RSK correspondence and how to implement it with both insertion and growth diagrams; the Pieri rules; the Murnaghan–Nakayama rule; Knuth equivalence; jeu de taquin; and the Littlewood–Richardson rule. The book also includes glimpses of recent developments and active areas of research, including Grothendieck polynomials, dual stable Grothendieck polynomials, Stanley's chromatic symmetric function, and Stanley's chromatic tree conjecture. Written in a conversational style, the book contains many motivating and illustrative examples. Whenever possible it takes a combinatorial approach, using bijections, involutions, and combinatorial ideas to prove algebraic results. The prerequisites for this book are minimal—familiarity with linear algebra, partitions, and generating functions is all one needs to get started. This makes the book accessible to a wide array of undergraduates interested in combinatorics. INTRODUCTION the author is writing these documents in response To The need for a concise and simple presentation of how to properly identify and Understand The types found in the tabernacle. The framework of the study is a general knowledge of the tabernacle. The author will explain why an understanding of the tabernacle is important to Christians. The history of the tabernacle will be pointed out. The materials and construction of the tabernacle will be studied. Also, The author will discuss the Levitical priesthood And The important subject of typology. Continued studies will be explained concerning three areas of the tabernacle and their furnishings: The outer-court, The Holy place And The Holy of Holies. There will be pointed out in this study items such as: The court of the tabernacle, The laver, The Mercy-Seat, The Ark of the Covenant, The Shewbread, The Golden Altar, The Holy Place, The Holy of Holies, The gate or the door, The priesthood And The function of the priesthood; which includes the offerings And The atonement. The altar, The offering and sacrifice, along with the atonement will be especially displayed. Also, though the tabernacle was built for Israel while in the wilderness, its believed that it was also a shadow of things to come. Because of that, there is consideration given to some study on sin, The veil and Jesus Christ. The tabernacle is scantly preached or taught in Churches today. Therefore, few people realize the great importance given To The tabernacle throughout scripture. Believers should study the tabernacle For The following reasons: 1. The study of the tabernacle is necessary for a proper understanding of God's redemptive program, which is progressively revealed throughout the Scriptures. 2. A study of the tabernacle with an understanding of it will inform sinful people about the holiness of God. 3. The study of the priesthood is foundational to an understanding of

Christ's priestly ministry. 4. The study of the sacrificial system within the tabernacle teaches the great importance that God placed on the need for a blood sacrifice to atone for sin. The author wishes that the readers of this study not only use this study for knowledge, but also to find and gain a closer relationship with God. A thorough introduction to tau functions, from the basics through to the most recent results, with applications in mathematical physics. This is the first introductory book on multiple zeta functions and multiple polylogarithms which are the generalizations of the Riemann zeta function and the classical polylogarithms, respectively, to the multiple variable setting. It contains all the basic concepts and the important properties of these functions and their special values. This book is aimed at graduate students, mathematicians and physicists who are interested in this current active area of research. The book will provide a detailed and comprehensive introduction to these objects, their fascinating properties and interesting relations to other mathematical subjects, and various generalizations such as their q-analogs and their finite versions (by taking partial sums modulo suitable prime powers). Historical notes and exercises are provided at the end of each chapter. Contents:Multiple Zeta FunctionsMultiple Polylogarithms (MPLs)Multiple Zeta Values (MZVs)Drinfeld Associator and Single-Valued MZVsMultiple Zeta Value IdentitiesSymmetrized Multiple Zeta Values (SMZVs)Multiple Harmonic Sums (MHSs) and Alternating VersionFinite Multiple Zeta Values and Finite Euler Sumsq-Analogs of Multiple Harmonic (Star) Sums Readership: Advanced undergraduates and graduate students in mathematics, mathematicians interested in multiple zeta values. Key Features:For the first time, a detailed explanation of the theory of multiple zeta values is given in book form along with numerous illustrations in explicit examplesThe book provides for the first time a comprehensive introduction to multiple polylogarithms and their special values at roots of unity, from the basic definitions to the more advanced topics in current active researchThe book contains a few quite intriguing results relating the special values of multiple zeta functions and multiple polylogarithms to other branches of mathematics and physics, such as knot theory and the theory of motivesMany exercises contain supplementary materials which deepens the reader's understanding of the main text Window functions—otherwise known as weighting functions, tapering functions, or apodization functions—are mathematical functions that are zero-valued outside the chosen interval. They are well established as a vital part of digital signal processing. Window Functions and their Applications in Signal Processing presents an exhaustive and detailed account of window functions and their applications in signal processing, focusing on the areas of digital spectral analysis, design of FIR filters, pulse compression radar, and speech signal processing. Comprehensively reviewing previous research and recent developments, this book: Provides suggestions on how to choose a window function for particular applications Discusses Fourier analysis techniques and pitfalls in the computation of the DFT Introduces window functions in the continuous-time and discrete-time domains Considers two implementation strategies of window functions in the time- and frequency domain Explores well-known applications of window functions in the fields of radar, sonar, biomedical signal analysis, audio processing, and synthetic aperture radar This volume provides a comprehensive, up-to-date survey of inequalities that involve a relationship between a function and its derivatives or integrals. The book is divided into 18 chapters, some of which are devoted to specific inequalities such as those of Kolmogorov-Landau, Wirtinger, Hardy, Carlson, Hilbert, Caplygin, Lyapunov, Gronwell and others. Over 800 references to the literature are cited; proofs are given when these provide insight into the general methods involved; and applications, especially to the theory of differential equations, are mentioned when appropriate. This volume will interest all those whose work involves differential and integral equations. It can also be recommended as a supplementary text. This revised and enlarged second edition is devoted to asymptotical questions of the theory of entire and plurisubharmonic functions. A separate chapter deals with applications in biophysics. The book is of interest to research specialists in theoretical and applied mathematics, postgraduates and students who are interested in complex and real analysis and its applications. Thorough introduction to an important area of mathematics Contains recent results Includes many exercises Bessel functions are associated with a wide range of problems in important areas of mathematical physics. Bessel function theory is applied to problems of acoustics, radio physics, hydrodynamics, and atomic and nuclear physics. Bessel Functions and Their Applications consists of two parts. In Part One, the author presents a clear and rigorous introduction to the theory of Bessel functions. Part Two is devoted to the application of Bessel functions to physical problems, particularly in the mechanics of solids and heat transfer. This volume was designed for engineers and researchers interested in the applications of the theory, and as such, it provides an indispensable source of reference. Thorough introduction to an important area of mathematics Contains recent results Includes many exercises Various procedures that are used in the field of industrial statistics, include switching/stopping rules between different levels of inspection. These rules are usually based on a sequence of previous inspections, and involve the concept of runs. A run is a sequence of identical events, such as a sequence of successes in a slot machine. However, waiting for a run to occur is not merely a superstitious act. In quality control, as in many other fields (e.g. reliability of engineering systems, DNA sequencing, psychology, ecology, and radar astronomy), the concept of runs is widely applied as the underlying basis for many rules. Rules that are based on the concept of runs, or "run-rules", are very intuitive and simple to apply (for example: "use reduced inspection following a run of 5 acceptable batches"). In fact, in many cases they are designed according to empirical rather than probabilistic considerations. Therefore, there is a need to investigate their theoretical properties and to assess their performance in light of practical requirements. In order to investigate the properties of such systems their complete probabilistic structure should be revealed. Various authors addressed the occurrence of runs from a theoretical point of view, with no regard to the field of industrial statistics or quality control. The main problem has been to specify the exact probability functions of variables which are related to runs. This problem was tackled by different methods (especially for the family of "order k distributions"), some of them leading to expressions for the probability function. In this work we present a method for computing the exact probability functions of variables which originate in systems with switching or stopping rules that are based on runs (including k-order variables as a special case). We use Feller's (1968) methods for obtaining the probability generating functions of run related variables, as well as for deriving the closed form of the probability function from its generating function by means of partial fraction expansion. We generalize Feller's method for other types of distributions that are based on runs, and that are encountered in the field of industrial statistics. We overcome the computational complexity encountered by Feller for computing the exact probability function, using efficient numerical methods for finding the roots of polynomials, simple recursive formulas, and popular mathematical software packages (e.g. Matlab and Mathematica). We then assess properties of some systems with switching/stopping run rules, and propose modifications to such rules.