Calculus C K Raju

This book grew out of a public lecture series, Alternative forms of knowledge construction in mathematics, conceived and organized by the first editor, and held annually at Portland State University from 2006. Starting from the position that mathematics is a human construction, implying that it cannot be separated from its historical, cultural, social, and political contexts, the purpose of these lectures was to provide a public intellectual space to interrogate conceptions of mathematics and mathematics education, particularly by looking at mathematical practices that are not considered relevant to mainstream mathematics education. One of the main thrusts was to contemplate the fundamental question of whose mathematics is to be valorized in a multicultural world, a world in which, as Paolo Freire said, "The intellectual activity of those without power is always characterized asnon-intellectual". To date, nineteen scholars (including the second editor) have participated in the series. All of the lectures have been streamed for global dissemination at:http://www.media.pdx.edu/dlcmedia/events/AFK/. Most of the speakers contributed a chapter to this book, based either on their original talk or on a related topic. The book is divided into four sections dealing with: • Mathematics and the politics of knowledge • Ethnomathematics • Learning to see mathematically • Mathematics education for social justice.

It?s no secret that certain social groups have predominated India?s business and trading history, with business traditionally being the preserve of particular `Bania? communities. However, the past four or so decades have seen a widening of the social base of Indian capital, such that the social profile of Indian business has expanded beyond recognition, and entrepreneurship and commerce in India are no longer the exclusive bastion of the old mercantile castes. In this meticulously researched book ? acclaimed for being the first social history to document and understand India?s new entrepreneurial groups ? Harish Damodaran looks to answer who the new `wealth creators? are, as he traces the transitional entry of India?s middle and lower peasant castes into the business world. Combining analytical rigour with journalistic flair, India?s New Capitalists is an essential read for anyone seeking to understand the culture and evolution of business in contemporary South Asia.

Logic and philosophy have many interfaces, some dating back to Antiquity, some developed only recently. These two companion volumes chart the variety and liveliness of modern logic at this interface, opening windows to key topics

`Tantrasangraha` By The Renowned Kerala Astronomer Nilakantha Somayaji (C. 1444-1545 Ad) Ranks Along With `Aryabhatiya` Of Aryabhata And Siddhantasiromani (C. 1150 Ad) Of Bhaskaracharya As One Of The Major Works Which Significantly Influenced All Further Work On Astronomy In India.

These provocative essays take a modern look at the 17th-century thinker's dream, examining the influences of mathematics on society, particularly in light of technological advances. They survey the conditions that elicit the application of mathematic principles; the applications' effectiveness; and how applied mathematics transform perceptions of reality. 1987 edition.

Is time, even locally, like the real line? Multiple structures of time, implicit in physics, create a consistency problem. A tilt in the arrow of time is suggested as the most conservative hypothesis which provides approximate consistency within physics and with topology of mundane time. Mathematically, the assumed constancy of the velocity of light (needed to measure time) implies functional differential equations of motion, that have both retarded and advanced deviating arguments with the hypothesis of a tilt. The novel features of such equations lead to a nontrivial structure of time and quantum-mechanical behaviour. The entire argument is embedded in a pedagogical exposition which amplifies, corrects, and questions the conventionally accepted approach. The exposition includes historical details and explains, for instance, why the entropy law is inadequate for time asymmetry, and why notions such as time asymmetry (hence causality) may be conceptually inadequate. The first three parts of the book are especially suited as supplementary reading material for undergraduate and graduate students and teachers of physics. The new ideas are addressed to researchers in physics and philosophy of science concerned with relativity and the interpretation of quantum mechanics.

The Lost Age of Reason deals with a fascinating and rich episode in the history of philosophy, one from which those who are interested in the nature of modernity and its global origins have a great deal to learn. Early modernity in India consists in the formation of a new philosophical self, one which makes it possible meaningfully to conceive of oneself as engaging the ancient and the alien in conversation. The ancient texts are now not thought of as authorities to which one must defer, but regarded as the source of insight in the company of which one pursues the quest for truth. This new attitude implies a change in the conception of one's duties towards the past. After reconstructing the historical intellectual context in detail, and developing a suitable methodological framework, Ganeri reviews work on the concept of knowledge, the nature of evidence, the self, the nature of the categories, mathematics, realism, and a new language for philosophy. A study of early modern philosophy in India has much to teach us today - about the nature of modernity as such, about the reform of educational institutions and its relationship to creative research, and about cosmopolitan identities in circumstances of globalisation.

The description for this book, Proclus: A Commentary on the First Book of Euclid's Elements, will be forthcoming.

Berkeley's philosophy has been much studied and discussed over the years, and a growing number of scholars have come to the realization that scientific and mathematical writings are an essential part of his philosophical enterprise. The aim of this volume is to present Berkeley's two most important scientific texts in a form which meets contemporary standards of scholarship while rendering them accessible to the modern reader. Although editions of both are contained in the fourth volume of the Works, these

lack adequate introductions and do not provide com plete and corrected texts. The present edition contains a complete and critically established text of both De Motu and The Analyst, in addi tion to a new translation of De Motu. The introductions and notes are designed to provide the background necessary for a full understanding of Berkeley's account of science and mathematics. Although these two texts are very different, they are united by a shared a concern with the work of Newton and Leibniz. Berkeley's De Motu deals extensively with Newton's Principia and Leibniz's Specimen Dynamicum, while The Analyst critiques both Leibnizian and Newto nian mathematics. Berkeley is commonly thought of as a successor to Locke or Malebranche, but as these works show he is also a successor to Newton and Leibniz.

Description: This festschrift is presented to Professor D.P. Chattopadhyaya on the occassion of his sixty-fifth birthday. It consists of twenty-two contributions centering around his thought and works by eminent scholars from India and abroad. These essays, ranging from philosophy to science, history, culture, social and political studies are concerned with issues that have engaged Chattopadhyaya's attention throughout his work starting from the earliest period till today. Chattopadhyaya is one of the propounders of interdisciplinary studies in the country.

`Magnificent, a true magnum opus....A tremendously important piece of work.... A truly revolutionary book (not merely an excellent book)' - Arun Ghosh Time is a mystery that has perplexed humankind since time immemorial. Resolving this mystery is of significance not only to philosophers and physicists but is also a very practical concern. Our perception of time shapes our values and way of life; it also mediates the interaction between science and religion both of which rest fundamentally on assumptions about the nature of time. C K Raju begins with a critical exposition of various time-beliefs, ranging from the earliest times through Augustine, Newton and Einstein to Stephen Hawking and current notions of chaos and time travel. He traces the role of organised religion in subverting time beliefs for its political ends. The book points out how this resulted in a facile dichotomy between 'linear' and 'cyclic' time, thereby inaugurating a confusion which, according to the author, has handicapped Western thought ever since, eventually influencing the content of science itself. Thus, this book daringly asserts that physical theory, traditionally regarded as amoral and objective, has depended on cultural beliefs about time. The author points out that time beliefs are again being manipulated today as the credibility of science is being exploited to promote a picture of time and, hence, a pattern of human behaviour which is convenient to the agenda of globalisation of culture. The linkages between modern theology and this 'brave new physics' are traced against the wider context of the so-called 'clash of civilisations', and the attempts to remake the world order. The conclusions point to the need to de-theologise time. The author challenges Einstein's understanding of relativity theory and suggests that a 'tilt in the arrow of time', or a small tendency towards cyclicity, will help repair the prevalent confusion about time. A 'tilt' also enables a physics that permits both memory and creativity, so that purpose and spontaneous growth of order are returned to human life. The book ends with a vision of Man as Creator, surprising God. Extensive research in physics, the history of science, comparative religions, and sociology lend weight to the important and challenging conclusions reached by the author. Written as a rejoinder to Stephen Hawking's A Brief History of Time, this book goes much further and, unlike any previous book, it gives a critical exposition of various world religions-Buddhism, Christianity, Hinduism, Islam, and Jainism-while exploring their intricate links, through time beliefs, to current physics on the one hand, and to global political and economic trends, on the other. This book will appeal to scholars and laypersons equally. It will fascinate anyone who reads it and will teach its readers to question the unquestionable.

In 1917, Johann Radon published his fundamental work, where he introduced what is now called the Radon transform. Including important contributions by several experts, this book reports on ground-breaking developments related to the Radon transform throughout these years, and also discusses novel mathematical research topics and applications for the next century.

Academic life in Cambridge especially in Trinity College is viewed through the eyes of one of its greatest figures. Most of Prof. Littlewood's earlier work is presented along with a wealth of new material.

What does it mean to have a visual representation of a mathematical object, concept, or process? What visualization strategies support growth in mathematical thinking, reasoning, generalization, and knowledge? Is mathematical seeing culture-free? How can information drawn from studies in blind subjects help us understand the significance of a multimodal approach to learning mathematics? Toward a Visually-Oriented School Mathematics Curriculum explores a unified theory of visualization in school mathematical learning via the notion of progressive modeling. Based on the author's longitudinal research investigations in elementary and middle school classrooms, the book provides a compelling empirical account of ways in which instruction can effectively orchestrate the transition from personally-constructed visuals, both externally-drawn and internally-derived, into more structured visual representations within the context of a socioculturally grounded mathematical activity. Both for teachers and researchers, a discussion of this topic is relevant in the history of the present. The ubiquity of technological tools and virtual spaces for learning and doing mathematics has aroused interest among concerned stakeholders about the role of mathematics in these contexts. The book begins with a prolegomenon on the author's reflections on past and present visual studies in mathematics education. In the remaining seven chapters, visualization is pursued in terms of its role in bringing about progressions in mathematical symbolization, abduction, pattern generalization, and diagrammatization. Toward a Visually-Oriented School Mathematics Curriculum views issues surrounding visualization through the eyes of a classroom teacher-researcher; it draws on findings within and outside of mathematics education that help practitioners and scholars gain a better understanding of what it means to pleasurably experience the symmetric visual/symbolic reversal phenomenon – that is, seeing the visual in the symbolic and the symbolic in the visual."

Tantrasangraha, composed by the renowned Kerala astronomer N?lakantha Somay?j? (c.1444-1545 AD) ranks along with ?ryabhat?ya of ?ryabhata and Siddh?nta?iromani of Bh?skar?c?rya as one of the major works which significantly influenced further work on astronomy in India. One of the distinguishing features is the introduction of a major revision of the traditional Indian planetary model. N?lakantha arrived at a unified theory of planetary latitudes and a better formulation of the equation of centre for the interior planets (Mercury and Venus) than was previously available. In preparing the translation and explanatory notes, K. Ramasubramanian and M. S. Sriram have used authentic Sanskrit editions of Tantrasangraha by Surand Kunjan Pillai and K V Sarma. All verses have been translated into English, which have been supplemented with detailed explanations including all necessary mathematical relations, illustrative examples, figures and tables using modern mathematical notation.

Damodar Dharmananda Kosambi (July 31, 1907 - June 29, 1966) was a man with a Renaissance type of versatility: he had a wide range of knowledge without sacrificing depth. He was a mathematician, statistician, and polymath who contributed to genetics by introducing Kosambi's map function. He did pioneering work in numismatics and in compiling critical editions of ancient Sanskrit texts. Above all, he was an outstanding Marxist historian.//The present volume brings together articles by scholars who assess Kosambi's contributions to Indian historiography, Indology, philology, the study of religions, historical materialism, and our understanding of caste in Indian history. While most essays deal with Kosambi the historian, the final essay presents a detailed scientific, historical and political assessment of his mathematical work. The essays are neither allergic to, nor adulatory about, Kosambi's work, but seek to present a balanced and critical appraisal, as well as updating our knowledge with the current thinking in the field. //The editor of this volume, Prof. D. N. Jha, is an acclaimed historian. The other contributors are: Irfan Habib, Suvira Jaiswal, Prabhat Patnaik, C.K. Raju, Krishna Mohan Shrimali, Eugenia Vanina, and Kesavan Veluthat.

This book traces the first faltering steps taken in the mathematical theorisation of infinity which marks the emergence of modern mathematics. It analyses the part played by Indian mathematicians through the Kerala conduit, which is an important but neglected part of the history of mathematics. Passage to Infinity: Medieval Indian Mathematics from Kerala and its Impact begins with an examination of the social origins of the Kerala School and proceeds to discuss its mathematical genesis as well as its achievements. It presents the techniques employed by the School to derive the series expansions for sine, cosine, arctan, and so on. By using modern notation but remaining close to the methods in the original sources, it enables the reader with some knowledge of trigonometry and elementary algebra to follow the derivations. While delving into the nature of the socio-economic processes that led to the development of scientific knowledge in pre-modern India, the book also probes the validity or otherwise of the conjecture of the transmission of Kerala mathematics to Europe through the Jesuit channel. The book straddles two domains: science and social sciences. It will appeal to those interested in mathematics, statistics, medieval history, history of science and technology, links between mathematics and culture and the nature of movements of ideas across cultures.

This book is a geometrical survey of the Sanskrit and Prakrt scientific and quasi-scientific literature of India, beginning with the Vedic literature and ending with the early part of the 17th century. It deals in detail with the Sulbasutras in the Vedic literature, with the mathematical parts of Jaina Canonical works and of the Hindu Siddhantas and with the contributions to geometry made by the astronomer mathematicians Aryabhata I & II, Sripati, Bhaskara I & II, Sangamagrama Madhava, Paramesvara, Nilakantha, his disciples and a host of others. The works of the mathematicians Mahavira, Sridhara and Narayana Pandita and the Bakshali Manuscript have also been studied. The work seeks to explode the theory that the Indian mathematical genius was predominantly algebraic and computational and that it eschewed proofs and rationales. There was a school in India which delighted to demonstrate even algebraical results geometrically. In their search for a sufficiently good approximation for the value of pie Indian mathematicians had discovered the tool of integration. Which they used equally effectively for finding the surface area and volume of a sphere and in other fields. This discovery of integration was the sequel of the inextricable blending of geometry and series mathematics.

This volume is the outcome of a seminar on the history of mathematics held at the Chennai Mathematical Institute during January-February 2008 and contains articles based on the talks of distinguished scholars both from the West and from India. The topics covered include: (1) geometry in the oulvasatras; (2) the origins of zero (which can be traced to ideas of lopa in Paoini's grammar); (3) combinatorial methods in Indian music (which were developed in the context of prosody and subsequently applied to the study of tonal and rhythmic patterns in music); (4) a cross-cultural view of the development of negative numbers (from Brahmagupta (c. 628 CE) to John Wallis (1685 CE)); (5) Kunnaka, Bhavana and Cakravala (the techniques developed by Indian mathematicians for the solution of indeterminate equations); (6) the development of calculus in India (covering the millennium-long history of discoveries culminating in the work of the Kerala school giving a complete analysis of the basic calculus of polynomial and trigonometrical functions); (7) recursive methods in Indian mathematics (going back to Paoini's grammar and culminating in the recursive proofs found in the Malayalam text Yuktibhaua (1530 CE)); and (8) planetary and lunar models developed by the Kerala School of Astronomy. The articles in this volume cover a substantial portion of the history of Indian mathematics and astronomy. This book will serve the dual purpose of bringing to the international community a better perspective of the mathematical heritage of India and conveying the message that much work remains to be done, namely the study of many unexplored manuscripts still available in libraries in India and abroad.

The Volume Examines, In Depth, The Implications Of Indian History And Philosophy For Contemporary Mathematics And Science. The Conclusions Challenge Current Formal Mathematics And Its Basis In The Western Dogma That Deduction Is Infallible (Or That It Is Less Fallible Than Induction). The Development Of The Calculus In India, Over A Thousand Years, Is Exhaustively Documented In This Volume, Along With Novel Insights, And Is Related To The Key Sources Of Wealth-Monsoon-Dependent Agriculture And Navigation Required For Overseas Trade - And The Corresponding Requirement Of Timekeeping. Refecting The Usual Double Standard Of Evidence Used To Construct Eurocentric History, A Single, New Standard Of Evidence For Transmissions Is Proposed. Using This, It Is Pointed Out That Jesuits In Cochin, Following The Toledo Model Of Translation, Had Long-Term Opportunity To Transmit Indian Calculus Texts To Europe. The European Navigational Problem Of Determining Latitude, Longitude, And Loxodromes, And The 1582 Gregorian Calendar-Reform, Provided Ample Motivation. The Mathematics In These Earlier Indian Texts Suddenly Starts Appearing In European Works From The Mid-16Th Century Onwards, Providing Compelling Circumstantial Evidence. While The Calculus In India Had Valid Pramana, This Differed From Western Notions Of Proof, And The Indian (Algorismus) Notion Of Number Differed From The European (Abacus) Notion. Hence, Like Their Earlier Difficulties With The Algorismus, Europeans Had Difficulties In Understanding The Calculus, Which, Like Computer Technology, Enhanced The Ability To Calculate, Albeit In A Way Regarded As Epistemologically Insecure. Present-Day Difficulties In Learning Mathematics Are Related, Via Phylogeny Is Ontogeny , To These Historical Difficulties In Assimilating Imported Mathematics. An Appendix Takes Up Further Contemporary Implications Of The New Philosophy Of Mathematics For The Extension Of The Calculus, Which Is Needed To Handle The Infinities Arising In The Study Of Shock Waves And The Renormalization Problem Of Quantum Field Theory.

Quantum mechanics and the theory of operators on Hilbert space have been deeply linked since their beginnings in the early twentieth century. States of a quantum system correspond to certain elements of the configuration space and observables correspond to certain operators on the space. This book is a brief, but self-contained, introduction to the mathematical methods of quantum mechanics, with a view towards applications to Schrodinger operators. Part 1 of the book is a concise introduction to the spectral theory of unbounded operators. Only those topics that will be needed for later applications are covered. The spectral theorem is a central topic in this approach and is introduced at an early stage. Part 2 starts with the free Schrodinger equation and computes the free resolvent and time evolution. Position, momentum, and angular momentum are discussed via algebraic methods. Various mathematical methods are developed, which are then used to compute the spectrum of the hydrogen atom. Further topics include the nondegeneracy of the ground state, spectra of atoms, and scattering theory. This book serves as a self-contained introduction to spectral theory of unbounded operators in Hilbert space with full proofs and minimal prerequisites: Only a solid knowledge of advanced calculus and a one-semester introduction to complex analysis are required. In particular, no functional analysis and no Lebesgue integration theory are assumed. It develops the mathematical tools necessary to prove some key results in nonrelativistic quantum mechanics. Mathematical Methods in Quantum Mechanics is intended for beginning graduate students in both mathematics and physics and provides a solid foundation for reading more advanced books and current research literature. It is well suited for self-study and includes numerous exercises (many with hints).

The calculus of relations has been an important component of the development of logic and algebra since the middle of the nineteenth century, when Augustus De Morgan observed that since a horse is an animal we should be able to infer that the head of a horse is the head of an animal. For this, Aristotelian syllogistic does not suffice: We require relational reasoning. George Boole, in his Mathematical Analysis of Logic of 1847, initiated the treatment of logic as part of mathematics, specifically as part of algebra. Quite the opposite conviction was put forward early this century by Bertrand Russell and Alfred North Whitehead in their Principia Mathematica (1910 - 1913): that mathematics was essentially grounded in logic. Logic thus developed in two streams. On the one hand algebraic logic, in which the calculus of relations played a particularly prominent part, was taken up from Boole by Charles Sanders Peirce, who wished to do for the "calculus of relatives" what Boole had done for the calculus of sets. Peirce's work was in turn taken up by Schroder in his Algebra und Logik der Relative of 1895 (the third part of a massive work on the algebra of logic). Schroder's work, however, lay dormant for more than 40 years, until revived by Alfred Tarski in his seminal paper "On the calculus of binary relations" of 1941 (actually his presidential address to the Association for Symbolic Logic).

Perfected over three editions and more than forty years, this field- and classroom-tested reference: * Uses the method of maximum likelihood to a large extent to ensure reasonable, and in some cases optimal procedures. * Treats all the basic and important topics in multivariate statistics. * Adds two new chapters, along with a number of new sections. * Provides the most methodical, up-to-date information on MV statistics available.

Contributed articles on intellectual life and Hindu civilization presented at a seminar held in Shimla at 2003.

This book proposes a New Enlightenment - a new way of looking at the non-Western world. Breaking new ground, the essays chart a course beyond Eurocentric discourses (which completely ignore the contributions of Asia, Africa and Latin-America) and forms of nativism (which are usually ethnocentric discourses). The volume: Focuses on the historical aspects of knowledge-production and its colonization; Examines the genre of multilinear histories that displaces hegemonic Eurocentric discourses; Enlarges the scope of multilinear historicism whereby Asia, Europe, Africa and the Americas are drawn in a new humanistic knowledge system; Studies how colonization is resisted in both the non-Western and Western world. Lucid and engaging, this book will be of great interest to scholars and researchers of social theory, education, politics and public policy.

Examines the early developments and uses of mathematics in such places as Egypt, Mesopotamia, China, and India

This volume consists of a collection of articles based on lectures given by scholars from India, Europe and USA at the sessions on 'History of Indian Mathematics' at the AMS-India mathematics conference in Bangalore during December 2003. These articles cover a wide spectrum of themes in Indian mathematics. They begin with the mathematics of the ancient period dealing with Vedic Prosody and Buddhist Logic, move on to the work of Brahmagupta, of Bhaskara, and that of the mathematicians of the Kerala school of the classical and medieval period, and end with the work of Ramanaujan, and Indian contributions to Quantum Statistics during the modern era. The volume should be of value to those interested in the history of mathematics.

More Precisely provides a rigorous and engaging introduction to the mathematics necessary to do philosophy. It is impossible to fully understand much of the most important work in contemporary philosophy without a basic grasp of set theory, functions, probability, modality and infinity. Until now, this knowledge was difficult to acquire. Professors had to provide custom handouts to their classes, while students struggled through math texts searching for insight. More Precisely fills this key gap. Eric Steinhart provides lucid explanations of the basic mathematical concepts and sets out most commonly used notational conventions. Furthermore, he demonstrates how mathematics applies to many fundamental issues in branches of philosophy such as metaphysics, philosophy of language, epistemology, and ethics.

About the Book: This book Engineering Mathematics-II is designed as a self-contained, comprehensive classroom text for the second semester B.E. Classes of Visveswaraiah Technological University as per the Revised new Syllabus. The topics included are Differential Calculus, Integral Calculus and Vector Integration, Differential Equations and Laplace Transforms. The book is written in a simple way and is accompanied with explanatory figures. All this make the students enjoy the subject while they learn. Inclusion of selected exercises and problems make the book educational in nature. It shou.

The get-it-over-with-quickly approach to statistics has been encouraged - and often necessitated - by the short time allotted to it in most curriculums. If included at all, statistics is presented briefly, as a task to be endured mainly because pertinent questions may appear in subsequent examinations for licensure or other certifications. However, in later professional activities, clinicians and biomedical researchers will constantly be confronted with reports containing statistical expressions and analyses. Not just a set of cookbook recipes, Principles of Medical Statistics is designed to get you thinking about data and statistical procedures. It covers many new statistical methods and approaches like box plots, stem and leaf plots, concepts of stability, the bootstrap, and the jackknife methods of resampling. The book is arranged in a logical sequence that advances from simple to more elaborate results. The text describes all the conventional statistical procedures, and offers reasonably rigorous accounts of many of their mathematical justifications. Although the conventional mathematical principles are given a respectful account, the book provides a distinctly clinical orientation with examples and teaching exercises drawn from real world medical phenomena. Statistical procedures are an integral part of the basic background needed by biomedical researchers, students, and clinicians. Containing much more than most elementary texts, Principles of Medical Statistics fills the gap often found in the current curriculum. It repairs the imbalance that gives so little attention to the role of statistics as a prime component of basic biomedical education.

Lack of ability to think probabilistically makes one prone to a variety of irrational fears and vulnerable to scams designed to exploit probabilistic naiveté, impairs decision making under uncertainty, facilitates the misinterpretation of statistical information, and precludes critical evaluation of likelihood claims. Cognition and Chance presents an overview of the information needed to avoid such pitfalls and to assess and respond to probabilistic situations in a rational way. Dr. Nickerson investigates such questions as how good individuals are at thinking probabilistically and how consistent their reasoning under uncertainty

is with principles of mathematical statistics and probability theory. He reviews evidence that has been produced in researchers' attempts to investigate these and similar types of questions. Seven conceptual chapters address such topics as probability, chance, randomness, coincidences, inverse probability, paradoxes, dilemmas, and statistics. The remaining five chapters focus on empirical studies of individuals' abilities and limitations as probabilistic thinkers. Topics include estimation and prediction, perception of covariation, choice under uncertainty, and people as intuitive probabilists. Cognition and Chance is intended to appeal to researchers and students in the areas of probability, statistics, psychology, business, economics, decision theory, and social dilemmas.

The invention of numerals is perhaps the greatest abstraction the human mind has ever created. Virtually everything in our lives is digital, numerical, or quantified. The story of how and where we got these numerals, which we so depend on, has for thousands of years been shrouded in mystery. Finding Zero is an adventure filled saga of Amir Aczel's lifelong obsession: to find the original sources of our numerals. Aczel has doggedly crisscrossed the ancient world, scouring dusty, moldy texts, cross examining so-called scholars who offered wildly differing sets of facts, and ultimately penetrating deep into a Cambodian jungle to find a definitive proof. Here, he takes the reader along for the ride. The history begins with the early Babylonian cuneiform numbers, followed by the later Greek and Roman letter numerals. Then Aczel asks the key question: where do the numbers we use today, the so-called Hindu-Arabic numerals, come from? It is this search that leads him to explore uncharted territory, to go on a grand quest into India, Thailand, Laos, Vietnam, and ultimately into the wilds of Cambodia. There he is blown away to find the earliest zero—the keystone of our entire system of numbers—on a crumbling, vine-covered wall of a seventh-century temple adorned with eaten-away erotic sculptures. While on this odyssey, Aczel meets a host of fascinating characters: academics in search of truth, jungle trekkers looking for adventure, surprisingly honest politicians, shameless smugglers, and treacherous archaeological thieves—who finally reveal where our numbers come from.

Cultural Foundations of MathematicsThe Nature of Mathematical Proof and the Transmission of the Calculus from India to Europe in the 16th C. CEPearson Education India

This collection of articles and review essays, including many hard to find pieces, comprises the most important and fundamental studies of Indian logic and linguistics ever undertaken. Frits Staal is concerned with four basic questions: Are there universals of logic that transcend culture and time? Are there universals of language and linguistics? What is the nature of Indian logic? And what is the nature of Indian linguistics? By addressing these questions, Staal demonstrates that, contrary to the general assumption among Western philosophers, the classical philosophers of India were rationalists, attentive to arguments. They were in this respect unlike contemporary Western thinkers inspired by existentialism or hermeneutics, and like the ancient Chinese, Greeks, and many medieval European schoolmen, only—as Staal says—more so. Universals establishes that Asia's contributions are not only compatible with what has been produced in the West, but a necessary ingredient and an essential component of any future human science.

The book presents high-quality papers presented at 3rd International Conference on Applications of Fluid Dynamics (ICAFD 2016) organized by Department of Applied Mathematics, ISM Dhanbad, Jharkhand, India in association with Fluid Mechanics Group, University of Botswana, Botswana. The main theme of the Conference is "Sustainable Development in Africa and Asia in context of Fluid Dynamics and Modeling Approaches". The book is divided into seven sections covering all applications of fluid dynamics and their allied areas such as fluid dynamics, nanofluid, heat and mass transfer, numerical simulations and investigations of fluid dynamics, magnetohydrodynamics flow, solute transport modeling and water jet, and miscellaneous. The book is a good reference material for scientists and professionals working in the field of fluid dynamics.

Geometry defines the world around us, helping us make sense of everything from architecture to military science to fashion. And for over two thousand years, geometry has been equated with Euclid's Elements, arguably the most influential book in the history of mathematics In The King of Infinite Space, renowned mathematics writer David Berlinski provides a concise homage to this elusive mathematician and his staggering achievements. Berlinski shows that, for centuries, scientists and thinkers from Copernicus to Newton to Einstein have relied on Euclid's axiomatic system, a method of proof still taught in classrooms around the world. Euclid's use of elemental logic -- and the mathematical statements he and others built from it -- have dramatically expanded the frontiers of human knowledge. The King of Infinite Space presents a rich, accessible treatment of Euclid and his beautifully simple geometric system, which continues to shape the way we see the world.

On stock Western history, science originated among the Greeks, and then developed in post-renaissance Europe. This story was fabricated in three phases. First, during the Crusades, scientific knowledge from across the world, in captured Arabic books, was given a theologically-correct origin by claiming it was all transmitted from the Greeks. The key cases of Euclid (geometry) and Claudius Ptolemy (astronomy) both concocted figures are used to illustrate this process. Second, during the Inquisition, world scientific knowledge was again assigned a theologically-correct origin by claiming it was not transmitted from others, but was independently rediscovered by Europeans. The cases of Copernicus and Newton (calculus) illustrate this process of revolution by rediscovery. Third, the appropriated knowledge was reinterpreted and aligned to post-Crusade theology. Colonial and racist historians exploited this, arguing that the (theologically) correct version of scientific knowledge (geometry, calculus, etc.) existed only in Europe.

This volume is the first of two containing selected papers from the International Conference on Advances in Mathematical Sciences (ICAMS), held at the Vellore Institute of Technology in December 2017. This meeting brought together researchers from around the world to share their work, with the aim of promoting collaboration as a means of solving various problems in modern science and engineering. The authors of each chapter present a research problem, techniques suitable for solving it, and a discussion of the results obtained. These volumes will be of interest to both theoretical- and application-oriented individuals in academia and industry. Papers in Volume I are dedicated to active and open areas of research in algebra, analysis, operations research, and statistics, and those of Volume II consider differential equations, fluid mechanics, and graph theory.

Sri Gopal Mohanty has made pioneering contributions to lattice path counting and its applications to probability and statistics. This is clearly evident from his lifetime publications list and the numerous citations his publications have received over the past three decades. My association with him began in 1982 when I came to McMaster Univer sity. Since then, I have been associated with him on many different issues at professional as well as cultural levels; I have benefited greatly from him on both these grounds. I have enjoyed very much being his colleague in the statistics group here at McMaster University and also as his friend. While I admire him for his honesty, sincerity and dedication, I appreciate very much his kindness, modesty and broad-mindedness. Aside from our common interest in mathematics and statistics, we both have great love for Indian classical music and dance. We have spent numerous many different subjects associated with the Indian music and hours discussing dance. I still remember fondly the long drive (to Amherst, Massachusetts) I had a few years ago with him and his wife, Shantimayee,

and all the hearty discussions we had during that journey. Combinatorics and applications of combinatorial methods in probability and statistics has become a very active and fertile area of research in the recent past.

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