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   Titolo   Pi: The Next Generation : A Sourcebook on the Recent History of Pi and Its Computation / / by David H. Bailey, Jonathan M. Borwein

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   Edizione   [1st ed. 2016.]

   Descrizione fisica   1 online resource (XIV, 507 p.)

   Disciplina   518

   Soggetti   Computer science - Mathematics
                        Number theory
                        Mathematics
                        History
                        Computational Mathematics and Numerical Analysis
                        Number Theory
                        History of Mathematical Sciences

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Nota di bibliografia   Includes bibliographical references at the end of each chapters and index.

   Nota di contenuto   Foreword -- Preface -- Introduction -- Computation of pi using arithmetic-geometric mean -- Fast multiple-precision evaluation of elementary functions -- The arithmetic-geometric mean of Gauss -- The arithmetic-geometric mean and fast computation of elementary functions -- A simplified version of the fast algorithms of Brent and Salamin -- Is pi normal? -- The computation of pi to 29,360,000 decimal digits using Borweins' quartically convergent algorithm -- Gauss, Landen, Ramanujan, the arithmetic-geometric mean, ellipses, pi, and the ladies diary -- Vectorization of multiple-precision arithmetic program and 201,326,000 decimal digits of pi calculation.- Ramanujan and pi -- 11. Ramanujan, modular equations, and approximations to pi or how to compute one billion digits of pi -- Pi, Euler numbers, and asymptotic expansions -- A spigot algorithm for the digits of pi -- On the rapid computation of various polylogarithmic constants -- Similarities in irrationality proofs for pi, ln 2, (2), and

(3) -- Unbounded spigot algorithms for the digits of pi -- Mathematics by experiment: Plausible reasoning in the 21st century -- Approximations to pi derived from integrals with nonnegative integrands -- Ramanujan's series for 1/: A survey -- The computation of previously inaccessible digits of 2 and Catalan's constant -- Walking on real numbers -- Birth, growth and computation of pi to ten trillion digits -- Pi day is upon us again and we still do not know if pi is normal -- The Life of pi -- I prefer pi: A brief mathematical history and anthology of articles in the American Mathematical Monthly -- Bibliography -- Index.

Sommario/riassunto	This book contains a compendium of 25 papers published since the 1970s dealing with pi and associated topics of mathematics and computer science. The collection begins with a Foreword by Bruce Berndt. Each contribution is preceded by a brief summary of its content as well as a short key word list indicating how the content relates to others in the collection. The volume includes articles on actual computations of pi, articles on mathematical questions related to pi (e. g., "Is pi normal?"), articles presenting new and often amazing techniques for computing digits of pi (e.g., the "BBP" algorithm for pi, which permits one to compute an arbitrary binary digit of pi without needing to compute any of the digits that came before), papers presenting important fundamental mathematical results relating to pi, and papers presenting new, high-tech techniques for analyzing pi (i.e., new graphical techniques that permit one to visually see if pi and other numbers are "normal"). his volume="" is="" a="" companion="" to Pi: A Source Book whose third edition released in 2004. The present collection begins with 2 papers from 1976, published by Eugene Salamin and Richard Brent, which describe "quadratically convergent" algorithms for pi and other basic mathematical functions, derived from some mathematical work of Gauss. Bailey and Borwein hold that these two papers constitute the beginning of the modern era of computational mathematics. This time period (1970s) also corresponds with the introduction of high-performance computer systems (supercomputers), which since that time have increased relentlessly in power, by approximately a factor of 100,000,000, advancing roughly at the same rate as Moore's Law of semiconductor technology. This book may be of interest to a wide range of mathematical readers; some articles cover more advanced research questions suitable for active researchers in the field, but several are highly accessible to undergraduate mathematics students.