

THE OFFICIAL JOURNAL OF THE FIBONACCI ASSOCIATION





FEBRUARY

1982

On the Use of Fibonacci Recurrence Relations in the Design of Long Wavelength Filters and Interferometers L.C. Botten 1 On the Convergence of Iterated Exponentiation-III Michael Creutz & R.M. Sternheimer 7 Generalized Fermat and Mersenne Numbers Steve Ligh & Pat Jones 12 Fibonacci Numbers of Graphs Helmut Prodinger & Robert F. Tichy 16 Some Identities and Divisibility Properties of Linear Second-Order Recursion Sequences Neville Robbins 21 Polygonal Products of Polygonal Numbers and the Pell Equation L.C. Eggan, Peter C. Eggan & J.L. Selfridge 24 Waiting for the Kth Consecutive Success and The Fibonacci Sequence of Order K A.N. Philippou & A.A. Muwafi 28The Length of the Four-Number Game William A. Webb 33 36 Concerning a Paper by L.G. Wilson A.G. Shannon & A.F. Horadam 38 A Generalization of the Dirichlet Product K. Joseph Davis 41 **Combinatorial Aspects of an Infinite Pattern** of Integers A.F. Horadam & A.G. Shannon 44 One-Pile Time and Size Dependent Take-Away Games Jim Flanigan 51 Fibonacci-Cayley Numbers P.V. Satyanarayana Murthy 59 Generalizations of Some Problems on Fibonacci Numbers P.V. Satyanarayana Murthy 65 A Variant of the Fibonacci Polynomials Which Arises in the Gambler's Ruin Problem . Mark E. Kidwell & Clifford M. Hurvich 66 Generalized Fibonacci Numbers by Matrix Methods ... Dan Kalman 73 77Explicit Descriptions of Some Continued Fractions J.O. Shallit The Nonexistence of Quasiperfect Numbers of Certain Forms Graeme L. Cohen 81 **Representations of Every Integer as the Difference** of Powerful Numbers Wayne L. McDaniel 85

Elementary Problems and Solutions Edited by A.P. Hillman 89 Advanced Problems and Solutions Edited by Raymond E. Whitney 93 The Fibonacci Quarterly

Founded in 1963 by Verner E. Hoggatt, Jr. (1921-1980), Br. Alfred Brousseau, and I.D. Ruggles

THE OFFICIAL JOURNAL OF THE FIBONACCI ASSOCIATION DEVOTED TO THE STUDY OF INTEGERS WITH SPECIAL PROPERTIES

EDITOR

Gerald E. Bergum

BOARD OF DIRECTORS

G.L. Alexanderson (President), Leonard Klosinski (Vice-President), Marjorie Johnson (Secretary), Dave Logothetti (Treasurer), Richard Vine (Subscription Manager), Hugh Edgar and Robert Giuli.

ASSISTANT EDITORS

Maxey Brooke, Paul F. Byrd, Leonard Carlitz, H.W. Gould, A.P. Hillman, A.F. Horadam, David A. Klarner, Calvin T. Long, D.W. Robinson, M.N.S. Swamy, D.E. Thoro, and Charles R. Wall.

EDITORIAL POLICY

The principal purpose of *The Fibonacci Quarterly* is to serve as a focal point for widespread interest in the Fibonacci and related numbers, especially with respect to new results, research proposals, and challenging problems.

The *Quarterly* seeks articles that are intelligible yet stimulating to its readers, most of whom are university teachers and students. These articles should be lively and well motivated, with innovative ideas that develop enthusiasm for number sequences or the exploration of number facts.

Articles should be submitted in the format of the current issues of the *Quarterly*. They should be typewritten or reproduced typewritten copies, double spaced with wide margins and on only one side of the paper. Articles should be no longer than twenty-five pages. The full name and address of the author must appear at the beginning of the paper directly under the title. Illustrations should be carefully drawn in India ink on separate sheets of bond paper or vellum, approximately twice the size they are to appear in the *Quarterly*. Authors who pay page charges will receive two free copies of the issue in which their article appears.

Two copies of the manuscript should be submitted to GERALD E. BERGUM, DEPARTMENT OF MATHEMATICS, SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS, SD 57007. The author is encouraged to keep a copy for his own file as protection against loss.

Address all subscription correspondence, including notification of address changes, to SUB-SCRIPTION MANAGER, THE FIBONACCI ASSOCIATION, UNIVERSITY OF SANTA CLARA, SANTA CLARA, CA 95053.

Annual domestic Fibonacci Association membership dues, which include a subscription to *The Fibonacci Quarterly*, are \$20 for Regular Membership, \$28 for Sustaining Membership I, \$44 for Sustaining Membership II, and \$50 for Institutional Membership; foreign rates, which are based on international mailing rates, are somewhat higher than domestic rates (please write for details). *The Quarterly* is published each February, May, August and November.

All back issues of *The Fibonacci Quarterly* are available in microfilm or hard copy format from UNIVERSITY MICROFILMS INTERNATIONAL, 300 North Zeeb Road, Dept P.R., ANN ARBOR, MI 48106.