



# The Fibonacci Quarterly

THE OFFICIAL JOURNAL OF THE FIBONACCI ASSOCIATION

## TABLE OF CONTENTS

The Factorization of $x^5 \pm p^2x - k$ and Fibonacci Numbers .....	<i>Piero Filipponi and Michele Elia</i>	290
On Irrational Valued Series Involving Generalized Fibonacci Numbers .....	<i>M. A. Nyblom</i>	299
New Problem Web Site .....		304
Some Analogs of the Identity $F_n^2 + F_{n+1}^2 = F_{2n+1}$ .....	<i>R. S. Melham</i>	305
An Extension of an Old Problem of Diophantus and Euler .....	<i>Andrej Dujella</i>	312
Families of Identities Involving Sums of Powers of the Fibonacci and Lucas Numbers .....	<i>R. S. Melham</i>	315
Representation Grids for Certain Morgan-Voyce Numbers .....	<i>A. F. Horadam</i>	320
Author and Title Index .....		325
On the Sequences $T_n = T_{n-1} + T_{n-2} + hn + k$ .....	<i>Piero Filipponi and Giuseppe Fierro</i>	326
Some Remarks on Fibonacci Matrices .....	<i>Lawrence C. Washington</i>	333
On Second-Order Linear Recurrence Sequences: Wall and Wyler Revisited .....	<i>Hua-Chieh Li</i>	342
Network Properties of a Pair of Generalized Polynomials .....	<i>M. N. S. Swamy</i>	350
Sieve Formulas for the Generalized Fibonacci and Lucas Numbers .....	<i>Indulis Strazdins</i>	361
Announcement of the Ninth International Conference on Fibonacci Numbers and Their Applications .....		366
On the Discovery of the 38 <sup>th</sup> Known Mersenne Prime .....	<i>George Woltman</i>	367
Elementary Problems and Solutions .....	<i>Edited by Stanley Rabinowitz</i>	371
Advanced Problems and Solutions .....	<i>Edited by Raymond E. Whitney</i>	377
Volume Index .....		383

VOLUME 37

NOVEMBER 1999

NUMBER 4

## PURPOSE

The primary function of **THE FIBONACCI QUARTERLY** is to serve as a focal point for wide-spread interest in the Fibonacci and related numbers, especially with respect to new results, research proposals, challenging problems, and innovative proofs of old ideas.

## EDITORIAL POLICY

**THE FIBONACCI 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 new ideas that develop enthusiasm for number sequences or the exploration of number facts. Illustrations and tables should be wisely used to clarify the ideas of the manuscript. Unanswered questions are encouraged, and a complete list of references is absolutely necessary.

## SUBMITTING AN ARTICLE

Articles should be submitted using the format of articles in any current issues of **THE FIBONACCI QUARTERLY**. They should be typewritten or reproduced typewritten copies, that are clearly readable, double spaced with wide margins and on only one side of the paper. 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 print. Since the Fibonacci Association has adopted  $F_1 = F_2 = 1$ ,  $F_n + 1 = F_n + F_{n-1}$ ,  $n \geq 2$  and  $L_1 = 1$ ,  $L_2 = 3$ ,  $L_n + 1 = L_n + L_{n-1}$ ,  $n \geq 2$  as the standard definitions for The Fibonacci and Lucas sequences, these definitions *should not* be a part of future papers. However, the notations *must* be used. One to three *complete* A.M.S. classification numbers *must* be given directly after references or on the bottom of the last page. **Papers not satisfying all of these criteria will be returned.** See the new worldwide web page at:

<http://www.sdstate.edu/~wcsc/http/fibhome.html>

for additional instructions.

Two copies of the manuscript should be submitted to: **GERALD E. BERGUM, EDITOR, THE FIBONACCI QUARTERLY, DEPARTMENT OF COMPUTER SCIENCE, SOUTH DAKOTA STATE UNIVERSITY, BOX 2201, BROOKINGS, SD 57007-1596**, until March 1, 1998. *After March 1, 1998*, send articles to **CURTIS COOPER, DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE, CENTRAL MISSOURI STATE UNIVERSITY, WARRENSBURG, MO 64093-5045**.

Authors are encouraged to keep a copy of their manuscripts for their own files as protection against loss. The editor will give immediate acknowledgment of all manuscripts received.

The journal will now accept articles via electronic services. However, electronic manuscripts must be submitted using the typesetting mathematical wordprocessor AMS-TeX. Submitting manuscripts using AMS-TeX will speed up the refereeing process. AMS-TeX can be downloaded from the internet via the homepage of the American Mathematical Society.

## SUBSCRIPTIONS, ADDRESS CHANGE, AND REPRINT INFORMATION

Address all subscription correspondence, including notification of address change, to: **PATTY SOLSAA, SUBSCRIPTIONS MANAGER, THE FIBONACCI ASSOCIATION, P.O. BOX 320, AURORA, SD 57002-0320**.

Requests for reprint permission should be directed to the editor. However, general permission is granted to members of The Fibonacci Association for noncommercial reproduction of a limited quantity of individual articles (in whole or in part) provided complete reference is made to the source.

Annual domestic Fibonacci Association membership dues, which include a subscription to **THE FIBONACCI QUARTERLY**, are \$37 for Regular Membership, \$42 for Library, \$47 for Sustaining Membership, and \$74 for Institutional Membership; foreign rates, which are based on international mailing rates, are somewhat higher than domestic rates; please write for details. **THE FIBONACCI 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 **BELL & HOWELL INFORMATION & LEARNING, 300 NORTH ZEEB ROAD, P.O. BOX 1346, ANN ARBOR, MI 48106-1346**. Reprints can also be purchased from **BELL & HOWELL** at the same address.

©1999 by

The Fibonacci Association

All rights reserved, including rights to this journal issue as a whole and, except where otherwise noted, rights to each individual contribution.

# *The Fibonacci Quarterly*

*Founded in 1963 by Verner E. Hoggatt, Jr. (1921-1980)  
and Br. Alfred Brousseau (1907-1988)*

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

## **EDITOR**

PROFESSOR CURTIS COOPER, Department of Mathematics and Computer Science, Central Missouri State University, Warrensburg, MO 64093-5045 e-mail: cnc8851@cmsu2.cmsu.edu

## **EDITORIAL BOARD**

DAVID M. BRESSOUD, Macalester College, St. Paul, MN 55105-1899  
JOHN BURKE, Gonzaga University, Spokane, WA 99258-0001  
LEONARD CARLITZ, Emeritus Editor, Duke University, Durham, NC 27708-0251  
BART GODDARD, East Texas State University, Commerce, TX 75429-3011  
HENRY W. GOULD, West Virginia University, Morgantown, WV 26506-0001  
HEIKO HARBORTH, Tech. Univ. Carolo Wilhelmina, Braunschweig, Germany  
A.F. HORADAM, University of New England, Armidale, N.S.W. 2351, Australia  
STEVE LIGH, Southeastern Louisiana University, Hammond, LA 70402  
RICHARD MOLLIN, University of Calgary, Calgary T2N 1N4, Alberta, Canada  
GARY L. MULLEN, The Pennsylvania State University, University Park, PA 16802-6401  
HAROLD G. NIEDERREITER, Institute for Info. Proc., A-1010, Vienna, Austria  
SAMIH OBAID, San Jose State University, San Jose, CA 95192-0103  
NEVILLE ROBBINS, San Francisco State University, San Francisco, CA 94132-1722  
DONALD W. ROBINSON, Brigham Young University, Provo, UT 84602-6539  
LAWRENCE SOMER, Catholic University of America, Washington, D.C. 20064-0001  
M.N.S. SWAMY, Concordia University, Montreal H3G 1M8, Quebec, Canada  
ROBERT F. TICHY, Technical University, Graz, Austria  
ANNE LUDINGTON YOUNG, Loyola College in Maryland, Baltimore, MD 21210-2699

## **BOARD OF DIRECTORS THE FIBONACCI ASSOCIATION**

FRED T. HOWARD, *President*  
Wake Forest University, Winston-Salem, NC 27106-5239  
G.L. ALEXANDERSON, *Emeritus*  
Santa Clara University, Santa Clara, CA 95053-0001  
PETER G. ANDERSON, *Treasurer*  
Rochester Institute of Technology, Rochester, NY 14623-0887  
GERALD E. BERGUM  
South Dakota State University, Brookings, SD 57007-1596  
KARL DILCHER  
Dalhousie University, Halifax, Nova Scotia, Canada B3H 3J5  
ANDREW GRANVILLE  
University of Georgia, Athens, GA 30601-3024  
HELEN GRUNDMAN  
Bryn Mawr College, Bryn Mawr, PA 19101-2899  
MARJORIE JOHNSON, *Secretary*  
665 Fairlane Avenue, Santa Clara, CA 95051  
CLARK KIMBERLING  
University of Evansville, Evansville, IN 47722-0001  
JEFF LAGARIAS  
AT&T Labs-Research, Florham Park, NJ 07932-0971  
WILLIAM WEBB, *Vice-President*  
Washington State University, Pullman, WA 99164-3113