## Mathematical Reviews Sections

## enjor the convenience of having mathematical reviews at your desk. HAVE YOU THOUGHT HOW REALLY HANDY IT WOULD BE TO HAVE THE SECTIONS RELEVANT TO YOUR RESEARCH RIGHT BEFORE YOU?

MR has been divided into 37 affordable Sets for individual subscribers. Each month you can receive the Section Sets you have chosen with an'author index. With your December Sets you will receive an annual author and subject index (as with MR). Also available for Section subscribers are three-ring binders of sturdy quality in the familiar tangerine color of MR to hold your subscription. The binders have a two-inch spine and are adequate to hold 400 pages.

Section Sets are divided into Class 1 and Class 2 according to the estimated number of pages per year.

| Set | Sections | Subjects |  | $\square 21$ | 42, 43, 44, 45 | Harmonic analysis, integral |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\square 1 \mathrm{~A}$ | 00, 01 | General, history, biography (Class 1) |  | $\square 11$ | 46 | transforms/equations (Class 2) Functional analysis (Class 1) |
| $\square 1 \mathrm{~B}$ | 03, 04 | Logic, foundations, set theory (Class 1) |  | $\square 1 \mathrm{~K}$ | 47 | Operator theory (Class 1) |
|  |  |  |  | $\square 2 J$ | 49 | Calculus of variations, optimization (Class 2) |
| $\square 2 \mathrm{~A}$ | 06, 08 | Order, lattices, general systems (Class 2) |  | $\square \mathbf{~ 2 K ~}$ | 51, 52 | Geometry, convex sets (Class 2) |
|  |  |  |  | $\square 1 \mathrm{~L}$ | 53 | Differential geometry (Class 1) |
| $\square 1 \mathrm{D}$ | 10 | Number th | (Class 1) | $\square 2 \mathrm{~L}$ | 54 | General topology (Class 2) |
| $\square 2 \mathrm{~B}$ | 12 | Algebraic number theory, field theory, polynomials (Class 2) |  | $\square 1 \mathrm{M}$ | 55,57 58 | See 1E (18, 55, 57) <br> Global analysis, analysis on |
| $\square 2 \mathrm{C}$ | 13, 14 | Commutative rings and algebras, algebraic geometry (Class 2) |  | $\square 1 \mathrm{~N}$ | 60 | manifolds (Class 1) <br> Probability theory and stochas- |
| $\square 20$ | 15 | Linear and multilinear algebra, matrix theory (Class 2) |  | $\square 1 \mathrm{P}$ | 62 | tic processes (Class 1) <br> Statistics (Class 1) |
| $\square 2 \mathrm{E}$ | 16, 17 | Associative/nonassociative rings, algebras (Class 2) |  | $\begin{aligned} & \square 1 Q \\ & \square 1 R \end{aligned}$ | 65 | Numerical analysis (Class 1) Computer science (including |
| $\square 1 \mathrm{E}$ | 18, 55, 57 | Category theory, algebraic topology, manifolds (Class 1) |  | $\square \mathbf{~ 2 M ~}$ | 70, 73 | automata) (Class 1) <br> Mechanics of particles, systems, |
| $\square 1 F$ | 20 | Group theory, generalizations (Class 1) |  | $\square 2 \mathrm{~N}$ | 76, 78, 80 | (Class 2) <br> Fluid mechanics, optics, elec- |
| $\square 2 \mathrm{~F}$ | 22 | Topological groups, Lie groups (Class 2) |  |  |  | tromagnetics, thermodynamics (Class 2) |
| $\square 2 \mathrm{C}$ | 26, 28 | Real functions, measure, integration (Class 2) |  | $\begin{aligned} & \square 1 S \\ & \square 2 P \end{aligned}$ | $\begin{array}{r} 81 \\ 82,83,85,86 \end{array}$ | Quantum mechanics (Class 1) Other physics, astronomy, astro |
| $\square 1 \mathrm{G}$ | 30, 31, 32, 33 | Complex analysis, potential theory, special functions (Class 1) |  | $\square 1 \mathrm{~T}$ | 90 | physics, geophysics (Class 2) <br> Economics, operations re- <br> search, programming, games |
| $\square 1 \mathrm{H}$ | 34 | Ordinary differential equations <br> (Class 1) |  | $\square 2 \mathrm{Q}$ | 92 | (Class 1) <br> Biology and behavioral sci- |
| $\square 11$ | 35 | Partial differential equations (Class 1) |  | $\square 1 \mathrm{l}$ | 93 | ences (Class 2) <br> Systems theory; control (Class 1) |
| $\square \mathbf{2 H}$ | 39, 40, 41 | Finite differences, sequences, approximations (Class 2) |  | $\square 1 \mathrm{~V}$ | 94 | Information and communication, circuits (Class 1 ) |
|  |  | First Set |  | Each Add'l Set |  | Optional Binder |
|  |  | Class 1 | Class 2 | Class 1 | Class 2 | \$5.00 each |
|  | dividual | \$36 | \$27 | \$30 | \$21 |  |
|  | eviewer | 24 | 18 | 20 | 14 |  |

USE THIS PAGE OR A PHOTOCOPY TO ORDER.
Date
\$ _ _ enclosed for subscriptions selected and marked above.
$\square \quad \$ 5.00$ enclosed for $2^{\prime \prime}$ tangerine binder stamped MATHEMATICAI. REVIEWS SECTIONS on spine and front cover. (It is not required that one buy a binder.)
$\$ \ldots$ Total prepaid order.
Name__ Your AMS code ___ Address

## MATHFILE

## Mathematical Reviews Online

MATHFILE is the online version of MATHEMATICAL REVIEWS, the authoritative record of published mathematical literature throughout the world. MR, a publication of the American Mathematical Society, provides essentially complete worldwide coverage of pure mathematics as well as those works in applied mathematics, physics, engineering, computer science, biology, operations research and other fields containing new and interesting mathematics. It contains reviews of $\mathbf{3 5 , 0 0 0}$ to $\mathbf{4 0 , 0 0 0}$ items each year which have been published in over 1,500 journals, books and book series.

All this material is available online with BRS and Dialog. The database, called MATHFILE, includes all bibliographic and subject information on articles and books reviewed in Mathematical Reviews since 1973. The file will be updated monthly with the addition of approximately 3,000 new items.
In addition to the bibliographic information, MATHFILE contains all the primary and secondary subject classifications attached to those items. Furthermore, starting with the material from mid-1979 issues of Mathematical Reviews, the text of each review is in the file.

## Additional information may be obtained from

J. L. Selfridge, Executive Editor, (313) 764-7228

Mathematical Reviews, 611 Church Street, P.O. Box 8604, Ann Arbor, Michigan 48107
Taissa T. Kusma, Database Specialist, (401) 272-9500
American Mathematical Society, P.O. Box 6248, Providence, Rhode Island 02940

## MATHFILE User's Guide

A user's guide has been prepared by the Society to make searching MATHFILE easier, more effective and faster. The Guide includes:

Instructions. How to get started on the vendor's system, an explanation of the file and suggestions on search techniques.
List of Journals. Journal name abbreviations used by Mathematical Reviews, and the full titles as defined by the Library of Congress and those used by Mathematical Reviews; the ISSN, Coden, and useful publishing information.
Subject Classification Systems. A correlated display of the two (1970 and 1980) slightly different MR systems, and the Library of Congress system.
Index of terms occurring in the subject classification. Alphabetic listing of subject words from the MR classification system with the corresponding class numbers given for each. This list will be very helpful to searchers unfamiliar with the MR Subject Classification.
Title words of entries reviewed from 1973 to 1979, arranged alphabetically with class numbers under which the entries occurred and frequency of occurrence of each word in each section. Inversion of the title word list, arranged by classification number, showing which title words occurred in each section and with what frequency. This will be useful in finding the right words to search a specific subject.

|  | ORDER CODE | List | AMS Members |
| :--- | :--- | ---: | :---: |
| User's Guide, 350 pages | USERSGUIDE | $\$ 50$ | $\$ 38$ |
| *List of Journals, 91 pages | ABBREXPAN | 12 | 12 |
| *Subject Classifications, 47 pages | SUBJSEXPAN | 8 | 8 |
| *Subject Word Index, 82 pages | SUBJWORDIN | 15 | 15 |
| *Offprints of separate chapters |  |  |  |
| all AMS publications. Order from AMS, P. O. Box 1571, Annex Station, |  |  |  |
| 1, or call toll free $\mathbf{8 0 0 - 5 5 6 - 7 7 7 4 ~ t o ~ c h a r g e ~ w i t h ~ V i s a ~ o r ~ M a s t e r C a r d . ~}$ |  |  |  |

## Two prime sources for keeping abreast of innovative theories and applications



## NETWORKS

Editor-in-Chief: F. T. Boesch Stevens Institute of Technology
Networks is devoted to disseminating information on this interdisciplinary area. It publishes invited and submitted manuscripts with research results, design techniques, tutorial surveys, book reviews, bibliographies, algorithms, and computer implementation techniques. All manuscripts are refereed.
Representative articles from recent issues:
Classification in Vehicle Routing and Scheduling
L.D. Bodin and B. L. Golden

An Advanced Dual Incremental Network Algorithm
S. R. Schmidt, J. W. Barnes and P. A. Jensen

A Computational Analysis of Alternative Algorithms and Labeling Techniques for Finding Shortest Path Trees
R. Dial, F. Glover, D. Karney and D. Klingman

## A Cut Approach to a Class of Quadratic Integer Programming Problems

J. C. Picard and H.D. Ratliff

A Matroid Related to Finitely Chainlike, Countably Infinite Networks
A.C. Tucker and A.H. Zemanian

Volume 13, 1983 Quarterly $\$ 85$
Outside U.S. add $\$ 15$ for surface postage and handling, or add $\$ 55$ for airmail delivery.

## doumalof Graph'Theory

Founder-Editor: Frank Harary The University of Michigan
Managing Editors: Ralph J. Faudree and Richard H. Schelp, Memphis State University
Journal of Graph Theory presents current, informative articles on the theory of graphs, with emphasis on theorems, and provides a useful forum for the interchange of ideas between contributors and readers. Graph theory, a separate field within combinatorial theory, is applicable to essentially all disciplines of mathematics and statistics.

Representative and forthcoming articles:
Cycles in Digraphs-A Survey
J.-C. Bermond and C. Thomassen

## Vertices of Given Degree in a Random Graph

B. Bollobás

## On the Toroidal Thickness of

 GraphsI. Anderson

## The Connectivities of Line and Total Graphs <br> D. Bauer and R. Tindell

## On the Origin of the n-Arc Theorem

K. Menger

Volume 7, 1983 Quarterly $\$ 75$
Outside U.S. add $\$ 12$ for surface postage and handling, or add $\$ 44$ for airmail delivery.
J. P. Coleman and A. J. Monaghan, Chebyshev Expansions for the Bessel Function $J_{n}(z)$ in the Complex Plane ..... 343
F. M. Arscott, P. J. Taylor and R. V. M. Zahar, On the Numerical Construc- tion of Ellipsoidal Wave Functions ..... 367
G. Jaeschke, On the Smallest $k$ Such That All $k \cdot 2^{n}+1$ Are Composite ..... 381
Samuel S. Wagstaff, Jr., Divisors of Mersenne Numbers ..... 385
Peter Hagis, Jr., Sketch of a Proof That an Odd Perfect Number Relatively Prime to 3 Has at Least Eleven Prime Factors ..... 399
Masao Kishore, Odd Perfect Numbers Not Divisible by 3. II. ..... 405
Reviews and Descriptions of Tables and Books ..... 413Björck, Plemmons and Schneider, Editors 1, Ziegler, Editor 2, Hunt,Editor 3, Prudnikov, Brychkov and Marichev 4, Duff, Editor 5, Hagis 6Table Errata417Davis and Rabinowitz 590
MATHEMATICS OF COMPUTATION TABLE OF CONTENTS
January 1983
Daniel Michelson, Stability Theory of Difference Approximations for Multidi- mensional Initial-Boundary Value Problems ..... 1
A. H. Schatz and L. B. Wahlbin, On the Finite Element Method for Singularly Perturbed Reaction-Diffusion Problems in Two and One Dimensions .. ..... 47
Richard Sanders, On Convergence of Monotone Finite Difference Schemes with Variable Spatial Differencing ..... 91
Jim Douglas, Jr. and Mary Fanett Wheeler, Implicit, Time-Dependent Vari- able Grid Finite Difference Methods for the Approximation of a Linear Waterflood ..... 107
Peter A. Markowich and Christian A. Ringhofer, Collocation Methods for Boundary Value Problems on 'Long' Intervals ..... 123
Goong Chen, Wendell H. Mills, Jr., Shunhua Sun and David A Yost, Sharp Error Estimates for a Finite Element-Penalty Approach to a Class of Regulator Problems ..... 151
J. R. Cash, Block Runge-Kutta Methods for the Numerical Integration of Initial Value Problems in Ordinary Differential Equations, Part I. The Nonstiff Case ..... 175
J. R. Cash, Block Runge-Kutta Methods for the Numerical Integration of Initial Value Problems in Ordinary Differential Equations, Part II. The Stiff Case ..... 193
G. J. Cooper and A. Sayfy, Additive Runge-Kutta Methods for Stiff Ordinary Differential Equations ..... 207
O. Axelsson and I. Gustafsson, Preconditioning and Two-Level Multigrid Methods of Arbitrary Degree of Approximation ..... 219
Thomas R. Lucas, A Posteriori Improvements for Interpolating Periodic Splines ..... 243
Gregory M. Nielson, A Method for Interpolating Scattered Data Based Upon a Minimum Norm Network ..... 253
Moshe Levin, On the Approximate Calculation of Double Integrals ..... 273
Boris Mityagin, Quadratic Pencils and Least-Squares Piecewise-Polynomial Approximation ..... 283
P. H. M. Wolkenfelt, Modified Multilag Methods for Volterra Functional Equations ..... 301
Angelo Lucia, An Explicit Quasi-Newton Update for Sparse Optimization Calculations ..... 317
George Cybenko, A General Orthogonalization Technique With Applications to Time Series Analysis and Signal Processing ..... 323
Walter Gautschi, On the Convergence Behavior of Continued Fractions with Real Elements ..... 337

