# THE AMERICAN MATHEMATICAL MONTHLY

THE OFFICIAL JOURNAL OF

THE MATHEMATICAL ASSOCIATION OF AMERICA, INC.

**VOLUME 58** 



NUMBER 1

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## **American Mathematical Monthly Vol 105**

Jörg Arndt

#### **American Mathematical Monthly Vol 105:**

Waves in Complex Media Luca Dal Negro, 2022-05-04 This book offers a clear and interdisciplinary introduction to the structural and scattering properties of complex photonic media focusing on deterministic aperiodic structures and their conceptual roots in geometry and number theory. It integrates important results and recent developments into a coherent and physically consistent story balanced between mathematical designs scattering and optical theories and engineering device applications. The book includes discussions of emerging device applications in metamaterials and nano optics technology Both academia and industry will find the book of interest as it develops the underlying physical and mathematical background in partnership with engineering applications providing a perspective on both fundamental optical sciences and photonic device technology Emphasizing the comprehension of physical concepts and their engineering implications over the more formal developments this is an essential introduction to the stimulating and fast growing field of aperiodic optics and complex photonics Mathematics Everywhere Martin Aigner, Ehrhard Behrends, 2010 Mathematics is all around us Often we do not realize it though Mathematics Everywhere is a collection of presentations on the role of mathematics in everyday life through science technology and culture The common theme is the unique position of mathematics as the art of pure thought and at the same time as a universally applicable science. The authors are renowned mathematicians their presentations cover a wide range of topics From compact discs to the stock exchange from computer tomography to traffic routing from electronic money to climate change they make the math inside understandable and enjoyable An additional attractive feature is the leisurely treatment of some hot topics that have gained prominence in recent years such as Fermat s Theorem Kepler's packing problem and the solution of the Poincare Conjecture Or maybe you have heard about the Nash equilibrium of A Beautiful Mind fame or the strange future of quantum computers and want to know what it is all about Well open the book and take an up to date trip into the fascinating world of the mathematics all around us Table of Contents Prologue G von Randow Math becomes a cult description of a hope Case studies J H van Lint The mathematics of the compact disc H O Peitgen C Evertsz B Preim D Selle T Schindewolf and W Spindler Image processing and imaging for operation planning in liver surgery R Borndorfer M Grotschel and A Lobel The quickest path to the goal B Fiedler Romeo and Juliet spontaneous pattern formation and Turing s instability S Muller Mathematics and intelligent materials P Gritzmann Discrete tomography from battleship to nanotechnology J Richter Gebert Reflections on reflections Current topics W Schachermayer The role of mathematics in the financial markets A Beutelspacher Electronic money an impossibility or already a reality M Henk and G M Ziegler Spheres in the computer the Kepler conjecture E Behrends How do quanta compute The new world of the quantum computer I Kramer Fermat's Last Theorem the solution of a 300 year old problem K Sigmund A short history of the Nash equilibrium R Klein Mathematics in the climate of global change The central theme M Aigner Prime numbers secret codes and the boundaries of computability E Vogt The mathematics of knots D Ferus On soap

bubbles K Ecker Heat diffusion the structure of space and the Poincare Conjecture E Behrends Chance and mathematics a late love Epilogue P J Davis The prospects for mathematics in a multi media civilization The American Mathematical Monthly ,1898 Includes section Recent publications Matters Computational Jörg Arndt, 2010-10-01 This book provides algorithms and ideas for computationalists Subjects treated include low level algorithms bit wizardry combinatorial generation fast transforms like the Fourier transform and fast arithmetic for both real numbers and finite fields Various optimization techniques are described and the actual performance of many given implementations is examined. The focus is on material that does not usually appear in textbooks on algorithms The implementations are done in C and the GP language written for POSIX compliant platforms such as the Linux and BSD operating systems **Electronic Microwave Imaging** with Planar Multistatic Arrays Sherif Sayed Ahmed, 2014 Microwave imagers featuring a fully electronic scanning are highly demanded in security industrial and medical applications Planar multistatic arrays operating at close ranges offer exceptional image resolution and illumination coverage compared to conventional far field imaging Novel solutions for synthesizing multistatic arrays for close range imaging with a scalable topology are introduced in this work along with detailed experimental verifications in the millimeter wave range Consequently an electronic microwave imager based on modern digital beamforming techniques has been successfully realized High quality imaging of humans has been demonstrated which represents a key milestone for the future generations of personnel screening systems required for securing air traffic as well as critical infrastructures. The work establishes the theoretical foundations for designing electronic microwave imagers while addressing the associated challenges e.g. image reconstruction illumination adjustment signal processing hardware architecture calibration technique and results interpretation The achieved three dimensional complex valued images open vast opportunities for new applications to effectively utilize the advanced capabilities of microwave Matrix Theory Robert Piziak, P.L. Odell, 2007-02-22 In 1990 the National Science Foundation recommended that imaging every college mathematics curriculum should include a second course in linear algebra In answer to this recommendation Matrix Theory From Generalized Inverses to Jordan Form provides the material for a second semester of linear algebra that probes introductory linear algebra concepts whil **A First Course in Fractional Sobolev Spaces** Giovanni Leoni, 2023-04-12 This book provides a gentle introduction to fractional Sobolev spaces which play a central role in the calculus of variations partial differential equations and harmonic analysis The first part deals with fractional Sobolev spaces of one variable It covers the definition standard properties extensions embeddings Hardy inequalities and interpolation inequalities The second part deals with fractional Sobolev spaces of several variables The author studies completeness density homogeneous fractional Sobolev spaces embeddings necessary and sufficient conditions for extensions Gagliardo Nirenberg type interpolation inequalities and trace theory The third part explores some applications interior regularity for the Poisson problem with the right hand side in a fractional Sobolev space and some basic properties of the fractional

Laplacian The first part of the book is accessible to advanced undergraduates with a strong background in integration theory the second part to graduate students having familiarity with measure and integration and some functional analysis Basic knowledge of Sobolev spaces would help but is not necessary The book can also serve as a reference for mathematicians working in the calculus of variations and partial differential equations as well as for researchers in other disciplines with a solid mathematics background It contains several exercises and is self contained **Gaither's Dictionary of Scientific Quotations** Carl C. Gaither, Alma E. Cavazos-Gaither, 2012-01-04 This unprecedented collection of 27 000 quotations is the most comprehensive and carefully researched of its kind covering all fields of science and mathematics With this vast compendium you can readily conceptualize and embrace the written images of scientists laymen politicians novelists playwrights and poets about humankind s scientific achievements Approximately 9000 high quality entries have been added to this new edition to provide a rich selection of quotations for the student the educator and the scientist who would like to introduce a presentation with a relevant quotation that provides perspective and historical background on his subject Gaither s Dictionary of Scientific Quotations Second Edition provides the finest reference source of science quotations for all audiences. The new edition adds greater depth to the number of quotations in the various thematic arrangements and also provides new thematic categories Advances in Nonlinear Signal and Image Processing Stephen Marshall, Giovanni **Introduction to Analysis** Hidefumi Katsuura, 2024-10-03 This book focuses on the theoretical aspects L. Sicuranza, 2006 of calculus The book begins with a chapter on set theory before thoroughly discussing real numbers then moves onto sequences series and their convergence The author explains why an understanding of real numbers is essential in order to create a foundation for studying analysis Since the Cantor set is elusive to many a section is devoted to binary ternary numbers and the Cantor set The book then moves on to continuous functions differentiations integrations and uniform convergence of sequences of functions An example of a nontrivial uniformly Cauchy sequence of functions is given The author defines each topic identifies important theorems and includes many examples throughout each chapter The book also provides introductory instruction on proof writing with an emphasis on how to execute a precise writing style

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