



Romanian Academy



Babeş-Bolyai University

MATHEMATICA

Founded in 1929

VOLUME 65 (88)

N^o 2, December 2023

EA

EDITURA ACADEMIEI ROMÂNE

EDITORIAL BOARD

Editor-in-Chief

CONSTANTIN NĂSTĂSESCU
Romanian Academy
Bucharest, Romania

Deputy Editors-in-Chief

SEPTIMIU CRIVEI
Babeş-Bolyai University
Cluj-Napoca, Romania

ANDREI MARCUS
Babeş-Bolyai University
Cluj-Napoca, Romania

Managing Editor

BRIGITTE BRECKNER
Babeş-Bolyai University
Cluj-Napoca, Romania

Members

OCTAVIAN AGRATINI
Babeş-Bolyai University
Cluj-Napoca, Romania

SORIN DĂSCĂLESCU
Romanian Academy
Bucharest, Romania

IOAN A. RUS
Babeş-Bolyai University
Cluj-Napoca, Romania

ALEXANDRU ALEMAN
Lund University
Lund, Sweden

GAVRIL FARKAS
Humboldt University
Berlin, Germany

DAN TIBA
Simion Stoilow
Institute of Mathematics
of the Romanian Academy
Bucharest, Romania

DORIN ANDRICA
Babeş-Bolyai University
Cluj-Napoca, Romania

LOUIS FUNAR
Université de Grenoble I
Grenoble, France

TUDOR ZAMFIRESCU
Simion Stoilow
Institute of Mathematics
of the Romanian Academy
Bucharest, Romania

ZOLTÁN BALOGH
University of Bern
Bern, Switzerland

MIRELA KOHR
Babeş-Bolyai University
Cluj-Napoca, Romania

DAN COMAN
Syracuse University
Syracuse, United States

ADRIAN PETRUŞEL
Babeş-Bolyai University
Cluj-Napoca, Romania

MARIUS CRAINIC
University of Utrecht
Utrecht, The Netherlands

RADU PRECUP
Romanian Academy
Cluj-Napoca, Romania

Scientific secretary

MIHAI IANCU
Babeş-Bolyai University
Cluj-Napoca, Romania

Editorial assistant

IRINA FILIP

**Work published with financial support from Recurring Donor Fund
of the Romanian Academy.**

© 2023 EDITURA ACADEMIEI ROMÂNE

Calea 13 Septembrie nr. 13, sector 5, 050711 Bucureşti, România
Tel.: 4021-318 81 46; Fax: 4021-318 24 44; E-mail: edacad@ear.ro; <http://www.ear.ro>

MATHEMATICA

Historical note

MATHEMATICA was founded by Petre Sergescu in 1929 with the support of Dimitrie Pompeiu and Gheorghe Țițeica (the first directors of the journal), as well as of other members of the Faculty of Sciences from the University of Cluj. The journal was published without interruption between 1929 and 1948 and then, as a new series, from 1959 until today.

Publisher

MATHEMATICA is published by the Romanian Academy Publishing House under the auspices of the Mathematical Section of the Romanian Academy and the Department of Mathematics from Babeș-Bolyai University Cluj-Napoca. Romanian Academy and Babeș-Bolyai University Cluj-Napoca appoint and support the editorial work of the journal.

Aims and scope

Mathematica publishes original papers, preferably written in English, but also in French, German or Italian, in any area of pure and applied mathematics. In addition to research papers, the journal publishes proceedings of international conferences held in Romania and survey articles. The Editors will put strong emphasis on originality and applicability of the results. All manuscripts are strictly refereed and only papers of high quality are accepted for publication. The journal is reviewed or indexed by *Zentralblatt für Mathematik*, *Mathematical Reviews*, *Scopus* and *EBSCO*.

Information for authors

Our journal agrees with the international standards developed by COPE (Committee of Publication Ethics, <https://publicationethics.org>) for promoting integrity in research publication.

We strongly encourage electronic submission of the papers on the e-mail address of the Editorial Office. We also accept submissions by mail on the address of the Editorial Office, in which case the authors are requested to send the manuscript in duplicate. The authors are asked to provide an electronic address. Since the maximum number of pages of a yearly volume is 200, we recommend to the authors to submit papers not exceeding 15 printed pages. Manuscripts not accepted for publication are not returned to the authors. Upon acceptance, manuscripts should be carefully prepared by the authors using L^AT_EX with the `amsart.cls` document class and `mathcluj.sty` style file, available on the web page of the journal. Authors are requested to follow the arrangements in the sample article on our web page, or in a recent issue, for the style of sections, headings, equations, tables, figures and references.

Copyright information

The submission of a manuscript carries with it the author's assurance that it has not been copyrighted or published elsewhere (except in the form of an abstract or as part of a published lecture or thesis); that is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, and, after being accepted by *Mathematica*, it will not be published in another journal.

Editorial office

MATHEMATICA journal
Department of Mathematics
Faculty of Mathematics and Computer Science
Babeș-Bolyai University
Str. Mihail Kogălniceanu nr. 1, 400084 Cluj-Napoca, ROMANIA
E-mail: mathjour@math.ubbcluj.ro; <http://math.ubbcluj.ro/~mathjour>

Buying requests of the journal should be addressed to:

- **EDITURA ACADEMIEI ROMÂNIE**, Calea 13 Septembrie nr. 13, sector 5, 050711 București, România; Tel.: 4021-318 81 46, 4021-318 81 06, Fax: 4021-318 24 44, E-mail: edacad@ear.ro, Internet: <http://www.ear.ro>

All subscriptions should be addressed to:

- **ORION PRESS IMPEX 2000 S.R.L.**, P.O. Box 77-19, sector 3, București, România; Tel./Fax: 4021-610 67 65, 4021-210 67 87, Tel.: 4031-104 46 68; E-mail: office@orionpress.ro
- **S.C. MANPRES DISTRIBUTION S.R.L.**, Piața Presei Libere nr. 1, Corp B, Etaj 3, Cam. 301–302, sector 1, București, România; Tel./Fax: 4021-314 63 39, 4021-314 63 39; E-mail: abonamente@manpres.ro, office@manpres.ro, Internet: <http://www.manpres.ro>
- **DEREX COM S.R.L.**, E-mail: derex.com@yahoo.com
- **SORIRORI SOLUTIONS**, Tel.: 4076-526 20 77, 4076-516 64 33; E-mail: sorin.costreie@sorirori.ro, rosana.guta@sorirori.ro, Internet: <http://www.sorirori.ro>

ISSN 1222-9016
ISSN-L 1222-9016

MATHEMATICA, 65 (88), N^o 2, 2023, pp. 151–296

MATHEMATICA

VOLUME 65 (88), N° 2, December 2023

CONTENTS

ANTENEH TILAHUN ADIMASU	
Almost everywhere convergence of varying-parameter setting	
Cesáro means of Fourier series on the group of 2-adic integers	153
BILENDER P. ALLAHVERDIEV and HÜSEYİN TUNA	
Nonlinear fourth-order dynamic equations on unbounded time scales	166
AHMAD AL-OMARI, SANTANU ACHARJEE and MURAD ÖZKOÇ	
A new operator of primal topological spaces	175
CHABANE BEDJGUELEL, HACENE GHAROUT and BAKIR FARHI	
Dynamics analysis of the Weibull model	184
ABDELKARIM BOUA and BIJAN DAVVAZ	
Left multipliers and commutativity of 3-prime near-rings	197
BRAHİM BOUDINE and SOIBRI MOINDZE	
On the Goldie dimension of finitely generated locally cyclic modules	207
IULIA-ELENA CHIRU	
Strong inner and strong reflexive inverses in semiprime rings	215
IULIA-ELENA CHIRU and SEPTIMIU CRIVEI	
Von Neumann local matrices	219
SUBHASIS DAS	
An improvement of Cauchy radius for the zeros of a polynomial	229
AHMAD DELFAN and ALIREZA KAMEI MIRMOSTAFEE	
Some results on Baireness in generalized topological spaces	242
AHMED HAMROUNI and SAID BELOUL	
Existence of solutions for fractional integro-differential equations	
with integral boundary conditions	249
KWOK-PUN HO	
Modular Hadamard, Riemann-Liouville and Weyl fractional integrals	263
MOHAMED MELLAH and ALI HAKEM	
Existence and asymptotic behavior of solutions for non-linear	
wave equations of Kirchhoff type with viscoelasticity	275
IOAN PAPUC	
Lid driven cavity flow with two porous square obstacles	286