



MATHEMATICA

Founded in 1929

VOLUME~67~(90) $N^{\circ}~2,~December~2025$



EDITURA ACADEMIEI ROMÂNE

EDITORIAL BOARD

Editor-in-Chief Constantin Năstăsescu Romanian Academy Bucharest, Romania

 $Deputy\ Editors\text{-}in\text{-}Chief$

SEPTIMIU CRIVEI ANDREI MARCUS
Babeş-Bolyai University Babeş-Bolyai University
Cluj-Napoca, Romania Cluj-Napoca, Romania

Managing Editor

Brigitte Breckner Babeș-Bolyai University Cluj-Napoca, Romania

Members

Octavian Agratini Sorin Dăscălescu Babeş-Bolyai University Romanian Academy Cluj-Napoca, Romania Bucharest, Romania Alexandru Aleman GAVRIL FARKAS Lund University Humboldt University Lund, Sweden Berlin, Germany DORIN ANDRICA Louis Funar Babes-Bolyai University Université de Grenoble I Cluj-Napoca, Romania Grenoble, France Zoltán Balogh Mirela Kohr University of Bern Babeş-Bolyai University Bern, Switzerland Cluj-Napoca, Romania Adrian Petruşel Dan Coman Syracuse University Babeş-Bolyai University Syracuse, United States Cluj-Napoca, Romania

Marius Crainic

University of Utrecht

Utrecht, The Netherlands

Ioan A. Rus
Babeş-Bolyai University
Cluj-Napoca, Romania
Dan Tiba
Simion Stoilow
Institute of Mathematics
of the Romanian Academy
Bucharest, Romania
Tudor Zamfirescu
Simion Stoilow
Institute of Mathematics
of the Romanian Academy
Bucharest, Romania

$Scientific\ secretaries$

Radu Precup

Romanian Academy

Cluj-Napoca, Romania

MIHAI IANCU VIRGILIUS-AURELIAN MINUȚĂ Babeș-Bolyai University Babeș-Bolyai University Cluj-Napoca, Romania Cluj-Napoca, Romania

Editorial assistant IRINA FILIP

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

© 2025 EDITURA ACADEMIEI ROMÂNE

Calea 13 Septembrie nr. 13, sector 5, 050711 București, 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 Țiţeica (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 Babeş-Bolyai University Cluj-Napoca. Romanian Academy and Babeş-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. Uppon acceptance, manuscripts should be carefully prepared by the authors using IATEX 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 Babeş-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 ROMÂNE, Calea 13 Septembrie nr. 13, sector 5, 050711 Bucureşti, 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., Piaţa 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

VOLUME 67 (90), N° 2, December 2025

CONTENTS

Owais Ahmad
Characterization of vector-valued weak affine bi-frames
on positive half line148
Shahabaddin Ebrahimi Atani
Join-essential element graph of a lattice
BOUHARKET BENAISSA, NOURREDINE AZZOUZ and MEHMET SARIKAYA
On some Tchebyshev-type inequalities involving the k -weighted
fractional operator
Brigitte Breckner
A short note on locally convex topologies
SLIMANE EL AMRANI and ABDERRAHMANE RAJI
Certain commutativity criteria for 3-prime near-rings
via homoderivations
Arkabrata Ghosh
On the family of elliptic curves $y^2 = x^3 - m^2x + (pqr)^2$
Mustapha Ait Hammou
Weak solutions for a nonlinear problem for $p(x)$ -Laplacian-like
via topological degree methods
Khaled Ben Walid Mansour
Asymptotic behavior of solutions of some damped wave equations
with source term
Muhammad Aslam Noor and Khalida Inayat Noor
Resolvent dynamical systems and mixed general
variational inequalities248
RITU SEN
On function spaces with Cauchy convergence topology
and $\gamma_{\overline{c}_f}$ -covers
Amar Pal Verma and Rasmita Kar
Multiple positive solutions for a class of a nonlinear boundary
value problem on \mathbb{R}^N_+