Newsletter

BELGIAN MATHEMATICAL
SOCIETY

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Comité National de Mathématique   CNM

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NCW   Nationaal Comité voor Wiskunde

**Newsletter of the Belgian Mathematical Society
and the National Committee for Mathematics**

Contents

The next edition of this newsletter will appear on November 15th, hence, till November 8th all content can be sent to wendy.goemans@kuleuven.be.

Foreword

Dear colleagues and friends, fellow Mathematicians,

We're at the start of a splendid new academic year, with new initiatives and activities of the Belgian Mathematical Society. Firstly, and as you will read further in this newsletter, we will have our first "Young Scholar Day" at the U-residence on the VUB campus on December 20. During this event, 27 postdoctoral researchers working in all areas of Mathematics, will explain us their most fascinating results. On the same day, we will announce of the winner of our third "Young Scholar Award", Sophie Grivaux will deliver a Godeaux lecture and our general assembly will take place. On May 24 we will give the stage to PhD students to present their work during our next "PhD day", that will take place in Antwerp. Furthermore, in January we will lauch the "Jacques Tits chair", what this is exactly, we will tell in our next newsletters. For additional or first hand info, you can also keep an eye on our website (although before visiting the website, it is adviced to cross your fingers that the website wasn't deteled by a mysterious hacker the day before around 02:40 am).

I hope you will enjoy reading the newsletter. Don't forget to inform us about the initiatives and activities that are happening around you, so that we can spread the word via our newsletter. Wishing you a fruitful and happy academic year 23-24!

Joost.

1   News from the BMS & NCM

1.1   First Young Scholar Day

The first BMS Young Scholar Day will take place at the U-residence on the VUB campus on 20 December 2023.

Preliminary schedule:

- 9h00- 9h30 welcome and coffee
- 9h30- 10h30 Godeaux lecture by Sophie Grivaux
- 10h30- 11h00 coffee break
- 11h00- 12h15 parallel sessions 1a-b-c
- 12h15- 14h00 Lunch break
    - 12h15-12h45 Board meeting, decision on YSA '23
    - 13h30-14h00 BMS General Assembly - Announcement of YSA winner
- 14h00- 15h15 parallel sessions 2a-b-c
- 15h15- 15h45 coffee break
- 15h45- 17h00 parallel session 3a-b-c
- 17h00- 18h00 Drink

All information about registration will soon be available on the website
http://dwispc8.vub.ac.be/nieuwBMS/index.php?id=young-scholar-day-2023.

1.2 Call for Young Scholar Award

As you can see above, the BMS board will decide on the winner of the Young Scholar Award (YSA) 2023 on 20 December 2023. For the rules on this price, see the BMS website http://dwispc8.vub.ac.be/nieuwBMS/index.php?id=bms-prizes.

In case you want to propose a candidate, contact one of the board members, a list can be found on http://dwispc8.vub.ac.be/nieuwBMS/index.php?id=about-the-belgian-mathematical-society.

1.3 Save the date: PhD day 24 May 2024

The next PhD day of the BMS will take place on 24 May 2024 in Antwerp. All information will appear on http://dwispc8.vub.ac.be/nieuwBMS/index.php?id=phd-day-2024.

1.4 Bulletin of the Belgian Mathematical Society - Simon Stevin

Starting from Volume 28 the Bulletin of the Belgian Mathematical Society - Simon Stevin only appears online and is not printed any more. As a member of the BMS you have electronic access to all electronically available issues of the bulletin, free of charge. If you have any trouble logging in or accessing the journal, please contact customer_support@projecteuclid.org.

Content Volume 30 (1) July 2023

- Asymptotics of the eigenvalues of a fourth order differential operator with eigenvalue dependent and periodic boundary conditions **Boitumelo Moletsane, Bertin Zinsou** DOI: 10.36045/j.bbms.210416a
- The Schröder-Bernstein Property for Modules over Algebras **Gabriella D'Este, Derya Keskin Tütüncü** DOI: 10.36045/j.bbms.210626
- Surgery on Aut(F_2) **Sylvain Barré, Mikaël Pichot** DOI: 10.36045/j.bbms.210809
- Z°-ideals and Z-ideals in MV-algebras **Mahta Bedrood, Farhad Sajadian, Giacomo Lenzi, Arsham Borumand Saeid** DOI: 10.36045/j.bbms.211109
- Locating parameters of the total graph of $\Gamma(\mathbb{Z}_{2^n p^m})$ **Mona Gholamnia Taleshani, Mozhgan Taghidoost Laskukalayeh, Ahmad Abbasi** DOI: 10.36045/j.bbms.220128
- Asymptotic Behavior of a Periodic Sequence of Nonexpansive Mappings with Applications **Mehrnaz Sadat Hashemi, Hadi Khatibzadeh** DOI: 10.36045/j.bbms.220607
- p-Adic Schrödinger representations of the higher p-adic Heisenberg groups **Bertin Diarra, Tongobé Mounkoro** DOI: 10.36045/j.bbms.220912
- Cauchy Completeness, Lax Epimorphisms and Effective Descent for Split Fibrations **Fernando Lucatelli Nunes, Rui Prezado, Lurdes Sousa** DOI: 10.36045/j.bbms.221021

For the table of contents of previous issues, see https://projecteuclid.org/all/euclid.bbms.

2 (Online) Meetings, Conferences, Lectures, . . .

2.1 September 2023

Altaïr programme

September 2023 - April 2024, ULB

See the programme at the end of this newsletter.

2.2 October 2023

ICMAM Latin America Satellite Conference on Analysis and PDE

10-14 October, 2023, online

We would like to announce that the ICMAM Latin America Satellite Conference on Analysis and PDE 2023 will take place online from October 10 to 14, 2023. To get access to the talks and plenaries a registration is required, this registration is free of charge.

This conference serves as a satellite event of the highly successful ICMAM 2022 Latin America Conference and as a preparation for the next ICMAM 2024 Europe.

The following researchers are on the conference's speaker list:

- Charles Fefferman, Princeton University, USA
- Monica Visan, UCLA, USA
- Tobias Colding, MIT, USA
- Michael Ruzhansky, Ghent University, Belgium
- Nikolay Tzvetkov, ENS Lyon, France
- Virginia Naibo, Kansas State University, USA
- Patrick Gerard, l'université Paris-Sud, France
- Joachim Krieger, EPFL, Switzerland
- Boyan Sirakov, PUC-Rio, Brazil
- Enrique Zuazua, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
- Enrique Fernandez Cara, Universidad de Sevilla, Spain
- Felipe Linares, IMPA, Brazil
- Genni Fragnelli, Università degli Studi di Bari Aldo Moro, Italy
- Irene Sabadini, Politecnico Di Milano, Italy.

There is no registration fee for conference attendees, however, since it is a virtual conference, we ask that you make the registration (link below). The information requested is in the form below that will be used to publish the list of participants on the official website. The link to Zoom to attend the conference will be shared via e-mail only to the registered participants.

Registration link:
https://docs.google.com/forms/d/e/1FAIpQLSf8iBIpD50GkQZDYnzNBhGF8s3oWxDxuAkODNfIU1KT9WhGIQ/viewform

Conference Website: https://sites.google.com/view/icmam-analysispde-2023/home

ICMAM Latin America Website: https://sites.google.com/view/icmamlatinamerica/home

The registration deadline is September 30/2023.

The main objective of this event is to provide the opportunity for anyone interested in analysis and PDE to attend the sessions with the participation of outstanding mathematicians. For this reason, we greatly appreciate your support for the dissemination of this information.

2.3   Seminars and colloquia

Analysis & Geometry Seminar
UAntwerpen
(usually Wednesdays 16-17h during term)

This is the weekly research seminar of the analysis & geometry-interested people in Antwerp. During the semester, we have once per week a research talk in analysis and/or geometry and/or related topics. The list of speakers comprises researchers from Antwerp as well as other universities. Details (schedule, speakers, titles, abstracts, seminar room/ online/ hybrid etc.) can be found on the seminar webpage https://www.uantwerpen.be/nl/personeel/sonja-hohloch/private-webpage/seminars/analysis-geometry/

To be added/deleted from the mailing list, please send an email to:
sonja dot hohloch AT uantwerpen dot be

Ghent Geometric Analysis Seminar
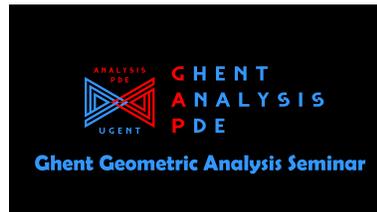
The Ghent Geometric Analysis seminar is dedicated to studying the modern techniques of elliptic and subelliptic partial differential equations (PDEs) that are used to establish new results in differential geometry and differential topology. We are planning to invite several of the leaders in the fields of microlocal analysis, geometric analysis, and harmonic analysis abroad.

In view of the recent activities and investigations undertaken by the members of the Ghent Analysis and PDE center and the works in the interplay of geometric analysis and harmonic analysis of our group, our seminar also will be a scenario for presenting the recent developments in the field and their applications to other branches in mathematics. Visit the website of our new Ghent Geometric Analysis Seminar at https://analysis-pde.org/seminars/ghent-on-geometric-analysis/

Upcoming seminars:

- Elmar Schrohe, Leibniz Universität Hannover, Germany.

Organisers:

- Duván Cardona Sanchez (Duvan.CardonaSanchez@UGent.be).
- Gihyun Lee, Ghent University,(gihyun.lee@ghent.ac.kr).
- David Santiago Gómez Cóbos (davidsantiago.gomezcobos@ugent.be).

Visit the website of the seminar to be informed of the scheduled intensive mini-courses about geometric analysis.

Ghent Methusalem Junior Seminar

The Ghent Methusalem Junior Seminar is run by PhD students and postdocs at the **Ghent Analysis & PDE Center** (https://analysis-pde.org).

It provides an ideal opportunity for young researchers in mathematics to share their ideas and to learn about new trends in a wide range of fields. Targeting a mainly (though not exclusively) young audience has meant for the organizers to ensure a relaxed atmosphere and to encourage the audience to engage in stimulating discussions with the speakers, ideally leading to new collaborations.

The seminar currently takes place every Wednesday at 4.30 PM (CEST) on ZOOM. For more information about our activity and about past and future talks, please visit the dedicated webpage: https://analysis-pde.org/ghent-methusalem-junior-seminar/

If you would like to give a talk or to invite someone to give a talk, please contact:

- Marianna Chatzakou (marianna.chatzakou@ugent.be)
- David Santiago Gómez Cobos (davidsantiago.gomezcobos@ugent.be)
- Gihyun Lee (gihyun.lee@ghent.ac.kr)
- Tapendu Rana (tapendu.rana@ugent.be)
- Kanat Tulenov (kanat.tulenov@ugent.be).

The following are the upcoming talks in the first term of the academic year 2023/24.

- Leonard Cadilhac (Sorbonne University, France)
- Meiram Akhymbek (Institute of Mathematics and Mathematical Modeling, Kazakhstan)

- Matthias Hofmann (Texas A&M University, USA)
- Hanbaek Lyu (University of Wisconsin-Madison, USA)
- Eske Ewert (Leibniz University Hannover, Germany)
- Matteo Levi (Universitat Autònoma de Barcelona, Spain)
- Luigi de Rosa (University of Basel, Switzerland)
- Omar Mohsen (Paris-Saclay University, France)

Ghent Methusalem Colloquium

The Ghent Methusalem Colloquium is intended for a broad audience of PhD students, postdocs and professors at the Ghent Analysis & PDE Center and beyond. The series includes colloquia from visiting and invited guests. Visit the website of our new Ghent Methusalem Colloquium at

https://analysis-pde.org/ghent-methusalem-colloquium/

During the last months, the Colloquium also incorporated diverse activities like mini courses and Methusalem weeks-days.

We thank to all the speakers who contributed to the Colloquim in the first part of the year:

1. Prof. Joel Fine (Université Libre de Bruxelles, Belgium)
2. Prof. Bob Rink (Vrije Universiteit Amsterdam, The Netherlands)
3. Prof. David Dos Santos Ferreira (Institut Élie Cartan, Université de Lorraine, France)
4. Prof. Dr. Sorin Pop (Hasselt University, Belgium)
5. Prof. Piero D'Ancona (Sapienza University of Rome, Italy)
6. Prof. S. Thangavelu (Indian Institute of Science, India)
7. Prof. Jérôme Le Rousseau (Sorbonne Paris Nord University, France)
8. Prof. Chris Stolk (University of Amsterdam, Netherlands)
9. Prof. H.-Q. Li (Shanghai, China)
10. Prof. Dr. P. Dattori da Silva (University of Sao Paulo, Brazil)

11. Dr. T. Ergashev (Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Uzbekistan)
12. Prof. A. Hasanov (Uzbek Academy of Sciences, Tashkent, Uzbekistan)
13. Dr. Daulti Verma (University of Delhi, India)
14. Prof. Roland Duduchava (The University of Georgia and A. Razmadze Mathematical Institute, Tbilisi, Georgia)
15. Prof. Christophe Geuzaine (University of Liège, Belgium)

3 PhD theses

Frequently Hypercyclic Random Vectors

Kevin Agneessens
Université de Mons
September 29, 2023 at 15:00, salle Vésale 020, Campus Plaine de Nimy, UMons

Thesis advisors: Prof. Dr. Karl Grosse-Erdmann (Université de Mons)

Summary:

Some results concerning the existence of almost surely frequently hypercyclic random vectors have been proved in the literature for certain chaotic weighted shifts. This is of interest for at least two reasons. It is usually difficult to find explicit (frequently) hypercyclic vectors, and random vectors have a probability distribution whose ergodic properties can be studied. The first objective of the thesis is to extend the previously known results. In particular, we prove that every chaotic weighted shift on very general sequence spaces and every operator satisfying the Frequent Hypercyclicity Criterion admits an almost surely frequently hypercyclic random vector. We also investigate the case of semigroups. The desired random vector is constructed using a stochastic integral. Although our general result requires that this integral is well defined, we can apply it to the translation semigroups on the space of entire functions.

The second part of the thesis deals with the rate of growth of frequently hypercyclic functions. We present two methods. Recently, a probabilistic approach provided a quasi-optimal rate of growth for the differentiation operator and the Taylor shift. Based on these results and the first part of the thesis, we obtain a general criterion for chaotic weighted shifts. The rate of growth is expressed as a function depending only on the weights, multiplied by some logarithmic factor. We give several examples of shifts defined on the space of entire functions or the space of holomorphic functions on the unit disk, recovering previous results and finding new ones. We also consider the differentiation operators on the space of harmonic functions on the plane and weighted shifts on Köthe sequence spaces. The possible optimality of the growth is also discussed. On spaces of holomorphic functions, we can also ask whether the growth holds outside some small, but possibly unbounded, set. We give results in this direction, which are stated for general random complex series. This second approach seems to be new in linear dynamics. In particular, we prove that for any chaotic weighted shift, the growth sought by the previous method does hold outside such a set.

4 News from the universities and other societies

4.1 How can we best support the advancement of mathematics in developing countries? By Riccardo Muolo and Germain Van Bever (Department of Mathematics and naXys, Université de Namur, Belgium)

For those of us who have grown up in the European Union and have the luck to be an academic in countries such as Belgium, one of the most developed and invested in research, it may be difficult to imagine the struggle to work in a university where students sometimes cannot pay for transportation or where even access to some basic simulation software is denied due to lack of resources. Nonetheless, during our careers, we might have thought to or have been faced with the issue of inequalities in research and we might have asked ourselves how to take a more active role against these inequalities?

In mathematics, we have the advantage that we do not need much equipment to conduct our research: pen, paper and a computer (and plenty of coffee); some of us, a software such as Mathematica or Matlab, and, all of us, access to journals and books. It can be expensive, but it is nothing if compared to the resources needed by our colleagues in biology or experimental physics. This (relative) favorable position of mathematics with respect to other sciences facilitates the steps we can take to support researchers in developing countries, and in particular the youngest ones.

A first concrete action we can think of is to give an affiliation to our departments to Early Stage Researchers (ESRs) we collaborate with, such as Master's and PhD students or junior PostDocs. First of all, they would have access to software and journals, which would be otherwise impossible at their institutions; then, it would also facilitate their travel funds applications to participate at conferences and workshops. Last but not least, an affiliation to a European University would make it easier to obtain a work visa and would enhance the possibility to find a position in the next step of their career. The interesting thing about this action is that it would be rather simple to implement and financially not too costly. Moreover, it would also benefit the European department, as it would increase the collaborations and the exchanges of researchers.

Following the same line of thought, PIs should encourage PhDs and PostDocs to visit institutes in less developed countries. Of course, a visit to Harvard or Cambridge would look good on a CV, but one shall not underestimate the outcome of a visit to a less famous institution. First of all, European ESRs would benefit academically (notwithstanding culturally). Lesser-known PIs may have more time to dedicate to mentoring and academic interactions, as they have smaller groups and fewer visits. It is also likely that the ESR would be introduced to lesser known quality works, increasing their bibliographic knowledge. Moreover, they would experience first-hand what it means to be in an underfunded institute and be part of the daily struggle researchers have to go through. This would increase the chance for them to grow into a PI who is more aware to such issues. Let us remember that those at the top are the ones with the real power to act change. Hopefully, by educating the young, we can start moving in the right direction.

There are already some valuable initiatives allowing students from certain regions to come to Belgium as Master or PhD students. These agreements exist at the federal, regional (such as the Ares/VLIR-UOS PhD scholarship in FWB and Flanders, respectively), but most often at the local (i.e. university) level. To the best of our knowledge, every university has a development/international cooperation office which can help in setting up new collaboration. Such initiatives are fundamental and we should praise our institutions for setting them up. Additionally, we believe that a more effective way to help would be to have specific scholarships for joint PhDs, meaning that the student would be part-time at their home institution and part-time in Belgium. This way, researchers at the student's home institution

would not lose contact with them and also other students and researchers would indirectly benefit from it. The bureaucracy for joint PhDs is rather complicated, so the first step to set up this initiative would be a simplification of such process.

As a last action, we think that, in general, there should be more scholarships allowing students from less developed countries to join our departments as Master's and PhD students. This requires more resources and, hence, it is of more difficult implementation when compared to the others.

We have thought of a list of possible concrete steps we can take to support our colleagues from developing countries, without invading their institutions nor impose our model of research. Evidently, this column does not address the real problems of inequalities, but merely proposes some minor treatments to mitigate the symptoms. We do not have any presumption of completeness and our goal is to start a discussion on how we can put to use the privilege we detain by living and working in one of the wealthiest and most developed countries. We should not be afraid to share our privileges; a more equal world, and, more specifically, more and better funded mathematicians, come to the advantage of our field, and of our society as a whole.

4.2   New Remote Lab of Ghent Analysis and PDE Center

The Ghent Analysis and PDE Center of Ghent University receives a second grant under the "Adjunct Research Professorship Program (Remote Lab) 2023-2028" from Armenia. Professor Dr. Michael Ruzhansky, serving as the Principal Investigator, spearheads the remote lab project hosted by Yerevan State University. You can find more information on the following link. http://scs.am/en/resultsofgrants
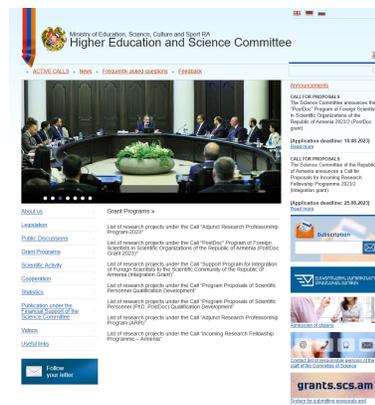
The topic of this research project is "Analysis on Groups and Applications," marking the sole mathematics program to receive funding.

http://scs.am/files/cank-eng-1664a2-01.09.23.pdf

This grant supplements the previously obtained ADVANCE Research Grant from the FAST Foundation, which was awarded for the project titled "Partial Differential Equations with Singularities" spanning from 2023 to 2027:

https://fast.foundation/en/program/847/2022/new_tab/6586/7034
http://scs.am/en/resultsofgrants

This increases the size of our remote lab in Armenia to the total of 14 people, with a funding of about 1,000,000 USD for the period of 4-5 years.

Code	PI	CI	Thematic area	Project Title	Host Institution
9. 23RL-2A031	Ghazaryan Davit; Valentyn Volkov	Mararyan Artsruni	Nanotechnology	Advanced Functional Materials	Yerevan State University
10. 23RL-1C037	Karataev Pavel; Sultan Dabagov	Margaryan Vardan	Physics and Astronomy	X-ray and giga-terahertz tomography and spectroscopy	NAS RA "Institute of Applied Problems of Physics"
11. 23RL-6C035	Pihlainen Kalle Antero	Mosinyan Davit	Philosophy, Ethics	ARMENIAN PARADIGMS OF MODERNIZATION	Yerevan State University
12. 23RL-6A006	Dum-Tragut Jasmine	Muradyan Haykuhi	History, Archeology	Interdisciplinary Armenian Cultural Heritage Studies	NAS RA "Institute of Archaeology and Ethnography"
13. 23RL-2A034	Yezekyan Torgom	Parsamyan Henrik	Nanotechnology	Intricate Plasmonic Architectures for Superior Sensing and Light Control: A Design and Characterization Study	Yerevan State University
14. 23RL-6A041	Chechushkov Igor	Vardanyan Benik	History, Archeology	Armenian Highland and Bronze Age World System. Ancient technology in the prism of experimental archaeology	NAS RA "Institute of Archaeology and Ethnography"
15. 23RL-1A027	Ruzhansky Michael; Zhirayr Avetisyan	Keryan Karen	Mathematics	Analysis on Groups, and Applications	Yerevan State University

Noteworthy is the composition of the international research team deployed in Armenia, maintaining a balanced representation with 50% female and 50% male researchers.

Further information and details on the activity of the remote lab will be available soon.

- PI: Prof Michael Ruzhansky (website:https://ruzhansky.org/).
- International coordination: Dr Zhirayr Avetisyan (website: http://www.z-avetisyan.com/).
- Local coordination: Dr Karen Keryan.

You can explore also the website to read more about the people in charge of these programs:

https://fast.foundation/en/program/847/2022/participants

4.3   Research Perspectives Ghent Analysis and PDE Center

There is a new series in Birkhäuser/Springer, associated to our Ghent Analysis and PDE Center: Research Perspectives Ghent Analysis and PDE Center. This series is located within Birkhäuser's Trends in Mathematics series.

Series description:

Research Perspectives Ghent Analysis and PDE Center is a book series devoted to the publication of extended abstracts of seminars, conferences, workshops, and other scientific events related to the Ghent Analysis and PDE Center. The extended abstracts are published in the subseries Research Perspectives Ghent Analysis and PDE Center within the book series Trends in Mathematics. All contributions undergo a peer-review process to meet the highest standard of scientific literature.

Volumes in the subseries will include a collection of revised written versions of the communications or short research announcements or summaries, grouped by events or by topics. Contributing authors to the extended abstracts volumes remain free to use their own material as in these publications for other purposes (for example a revised and enlarged paper) without prior consent from the publisher, provided it is not identical in form and content with the original publication and provided the original source is appropriately credited.

Type of papers:

Here is some more information on the type of the papers:

Each paper is 3-8 pages long (including title and references), the upper limit of 8 pages is strict It is expected that the paper is of an extended abstract type, namely: one can make a short research summary or announce some results without proofs. The idea is similar to publishing in journals like e.g. C.R.A.S. Paris, Funct. Anal. Appl., or Doklady RAN. Therefore, publishing a paper in this volume does not influence the publication of a full research paper, which can be published as usual elsewhere. The papers in the volume should be included in Scopus, MathSciNet and Zentralblatt Publication is free of charge, authors should get free electronic access to the whole volume.

Forthcoming volumes:

- Volume 1: Extended Abstracts MWCAPDE 2023
  Volume subtitle: Methusalem Workshop on Classical Analysis and Partial Differential Equations
  Volume editors: Michael Ruzhansky and Berikbol Torebek
- Volume 2: Extended Abstracts 2021/2022
  Volume subtitle: Methusalem Lectures
  Volume editors: Duván Cardona, Joel Restrepo, Michael Ruzhansky
- Volume 3: Extended Abstracts 2021/2022
  Volume subtitle: Ghent Analysis and PDE Seminar
  Volume editors: Michael Ruzhansky, Karel Van Bockstal
- Volume 4: Women in Analysis and PDE

    Volume editors: Marianna Chatzakou, Michael Ruzhansky, Diana Stoeva

- Volume 5: Analysis and PDE in Latin America
  Volume subtitle: ICMAM 2022 Latin America
  Volume editors: Duván Cardona, Brian Grajales
- Volume 6: Extended Abstracts 2022
  Subtitle: Analysis and Applied Mathematics
  Editors: Allaberen Ashyralyev, Michael Ruzhansky, Makhmud Sadybekov
  Project: Analysis and Applied Mathematics Seminar
- Volume 7: Extended Abstracts 2021-2022]
  Subtitle: Tbilisi Analysis and PDE Seminar
  Editors: Roland Duduchava (University of Georgia) Eugene Shargorodsky (King's College London) Georgi Tephnadze (University of Georgia)
  Project: Tbilisi Analysis and PDE seminar.
- Volume 8: Summer school "Modern Problems in PDEs and Applications"
  Subtitle: Ghent Analysis and PDE Center
  Editors: Marianna Chatzakou, Joel Restrepo, Michael Ruzhansky, Berikbol Torebek, Karel Van Bockstal
  Project: Summer School in Analysis and PDE.
- Volume 9: Extended Abstracts IPMS 2024
  Subtitle: International Conference "Inverse Problems: Modeling and Simulation"
  Editors: Alemdar Hasanov, Roman Novikov, Karel Van Bockstal.
  Project: IPMS 2024

Further information will appear on the website:

https://analysis-pde.org/research-perspectives-ghent-analysis-and-pde-center/

4.4   News from the ICMAM Latin America organisation

The organisation ICMAM Latin America aims to advance mathematical research in Latin America and the Caribbean, enhance its visibility, and foster collaboration among mathematicians from the region and abroad. The ICMAM conferences will be held biennially, either in a virtual format or in-person. You can find general information about the conference on our website, along with details about our highly active satellite conferences in 2023/2024, some of them supported by the ISAAC (International

Society for Analysis, its Applications and Computation), the Colombian Mathematical Society, the Mexican Mathematical Society, the Department of Mathematics at the Universidad del Valle-Colombia, and by the Ghent Analysis and PDE Center.

https://sites.google.com/view/icmamlatinamerica/home

Proceedings: It is our pleasure to announce that the ICMAM Project, committed to the advancement of the mathematical research in Latin America, is preparing some books related to our activities/conferences. With the participation of outstanding junior and senior researchers of the region, below you can find a list of books, that are (will be) providing a perspective of our current mathematical research in Latin America. Our series of Books have been supported by Prof. Dr. Michael Ruzhansky, Main Editor of the Series: Research Perspectives Ghent Analysis and PDE Center.

- Volume 1: Analysis and PDE in Latin America
  Subtitle: ICMAM 2022 Latin America (to appear in 2023).
  Editors: Duvan Cardona, Brian Grajales.
- Volume 2: Women in Mathematics Latin America 2024 Subtitle: ICMAM Latin America
  Editors: Yuriko Pitones, Karina Gonzalez.

ICMAM Latin America Satellite Conferences: The upcoming ICMAM Latin America Satellite Conferences in 2023 aim to bring together leading researchers in different fields from Latin America and around the world.

- **ICMAM Latin America Satellite Conference on Analysis and PDE 2023**, October 10th to October 14th, 2023.
  https://sites.google.com/view/icmam-analysispde-2023/home

- **ICMAM Latin America Satellite Conference on Algebra, Combinatorics, and Number Theory 2023**, 27-29 September.
  https://sites.google.com/view/icmam-latin-america/home
  Organisers:
  Yuriko Pitones, UAM - Iztapalapa, Mexico (Chair)
  Marlisha Sandoval-Miranda, UAM - Iztapalapa, Mexico

Jhon B. Caicedo, Universität Osnabrück, Germany

Luis Agustín Cárdenas, Universidad de Talca, Chile

- **ICMAM Latin America Satellite Conference on Data Science and Machine Learning 2023, 17th November 2023**.

  https://sites.google.com/view/icmamlatinamerica/home

  Organisers:

  Alexandra Garcia (Chair), Universidad Autónoma de Madrid, Spain and International Group Health Insurance, Allianz (Allianz SE).

  Edgardo S. Barraza Verdesoto, Universidad Minuto de Dios, Colombia.

PriRadio TV Highlights ICMAM Latin America's Mission and Goals

On September 2, 2023, **PriRadio TV**, led by **Benjamín Losada Posada**, featured a compelling interview with the team behind ICMAM Latin America. The interview provided an in-depth look at the organization's objectives and its pivotal role in advancing mathematical research in Latin America and the Caribbean.

Complete interview available at the link:
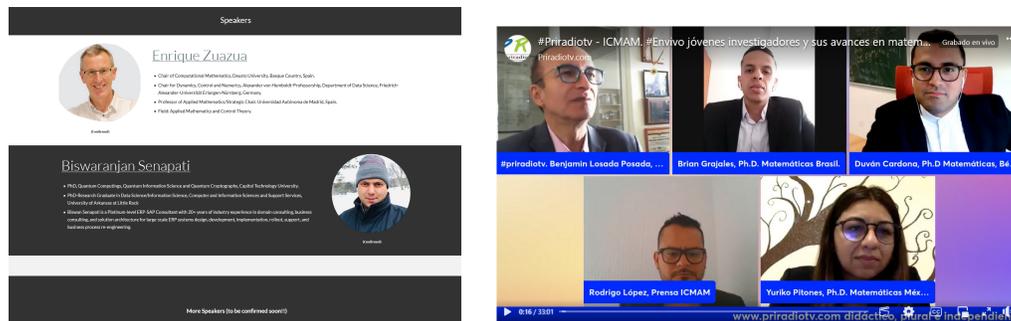
https://www.facebook.com/watch/live/?ref=watch_permalink&v=3429320980715642

Key highlights of the interview included:

Advancing Mathematical Research: ICMAM Latin America's primary goal is to advance mathematical research in Latin America and the Caribbean. The organization accomplishes this through biennial conferences, research programs, and collaboration with renowned mathematical societies and institutions.

Global Reach: Dr. Cardona and Dr. Grajales shared how ICMAM Latin America has expanded from its origins in Cali to involve more than 50 mathematicians from around the world. This global perspective underscores the organization's commitment to facilitating interaction between young, emerging researchers and established international mathematicians.

Gender Inclusivity: The interview emphasized ICMAM Latin America's dedication to promoting gender inclusivity within the field of mathematics. The organization actively supports and highlights the work of women mathematicians in Latin America, addressing gender disparities in the mathematical community.

PriRadio TV's coverage of ICMAM Latin America serves as a testament to the organization's growing impact on mathematical research and collaboration in the region. The interview highlighted the vital role that ICMAM Latin America plays in bridging the gap between mathematicians in Latin America and their counterparts worldwide.

About PriRadio TV (https://www.priradiotv.com/): PriRadio TV, under the leadership of **Benjamín**

Losada Posada, is a prominent media outlet known for its insightful coverage of various topics, including science, technology, and education. The organization plays a crucial role in showcasing stories that matter.

Scientific Board

- Duván Cardona, President of the Scientific Board, Ghent University, Belgium.
- Emanuel Carneiro, ICTP, The Abdus Salam International Centre for Theoretical Physics Trieste, Italy.
- Alicia Dickenstein, Former Vice-President, International Mathematical Union, University of Buenos Aires, Argentina.

- Uwe Kaehler, President of the ISAAC, International Society for Analysis, its Applications and Computations, & University of Aveiro, Portugal.
- Alf Onshuus, President of the SCM, Colombian Mathematical Society, Universidad de Los Andes, Colombia
- Claudia Garetto, Queen Mary University of London, United Kingdom
- Mitsuru Sugimoto, Member of the Mathematical Society of Japan, & Nagoya University, Japan
- Thaís Jordão, University of São Paulo, Brazil
- Yuriko Pitones, Universidad Autónoma Metropolitana- Iztapalapa, Mexico
- Jose Luis Ramirez, Universidad Nacional, Colombia
- Felipe Rincon, Queen Mary University of London, UK
- Carolina Benedetti, Universidad de los Andes, Colombia
- Martina Juhnke-Kubitzke, Universität Osnabrück, Germany
- Matilde Lalãn, Université de Montréal, Canada
- Sergio López-Permouth, Ohio University, USA
- Luis Núnez-Betancourt, CIMAT, Mexico
- Sonia Trepode, Universidad Nacional de Mar de Plata, Argentina
- José A. Samper, Pontificia Universidad Católica de Chile - Chile

Some involved researchers in our inclusive ICMAM Latin American organisation: This project has been supported by:

5 History, maths and art, fiction, jokes, quotations . . .

5.1 Mathfest

Op 17 september organiseert Platform Wiskunde Vlaanderen een wiskundefestival in Brugge:

http://www.platformwiskunde.be/mathfest-2023/

Wanneer: 17 september, 13-18 uur
Waar: Domein Beisbroek, sterrenwacht Cozmix te Brugge
Gratis toegang!

Vier met ons mee . . .

- . . . want we zullen samen met alle bezoekers een wereldrecord vestigen door zoveel mogelijk tegels te leggen met de recent ontdekte tegelvorm (de ein-stein-hat),

- . . . want Jean Paul Van Bendegem legt de eerste steen van dit nieuw wereldrecord, en zal de festivalgangers ook betrekken in een verrassend burgerexperiment,

- . . . want weerman David Dehenauw zal ons eindelijk uitleggen waarom wiskunde de schuld is van slecht weer, maar ook van goed weer,

- . . . want dit is de kans om de eerste wereldkampioen exotisch sudoku te worden,

- . . . want dankzij Eos en Grijze Cellen zullen we na een vurig debat eindelijk een consensus bereiken rond de zin van wiskunde in ons onderwijs,

- . . . want Conny en Thomas kunnen misschien geen mol vangen, maar wel de aandacht van jongeren voor hun project "Mad about Math",

- . . . want we zullen eindelijk de missing link begrijpen tussen weefgetouwen en AI,

- . . . want een wiskundefestival is het enige festival waar chaos(theorie) gewenst is,

- . . . want het aanbod is zo overweldigend dat het te veel is om op te noemen (humor, kunst, een spoortocht, MathsJam, de wiskunde van kleuren of van knutselen of van goochelen of van dromenvangers of van. . .),

- . . . want www.imaginarymaths.be kan voor de allerlaatste keer bezocht worden. Deze reizende tentoonstelling brengt de schoonheid van wiskunde in beeld, waaronder de non-periodieke betegeling van Nobelprijswinnaar Roger Penrose.

5.2   400 years of mechanical calculating
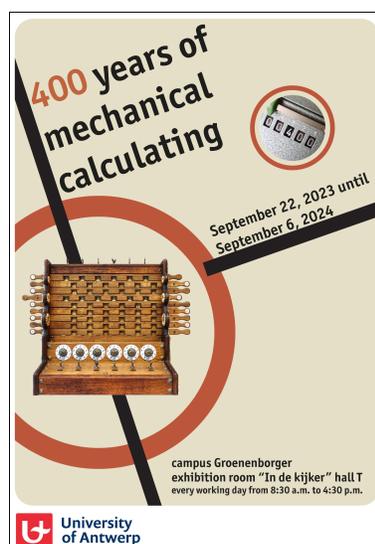
5.3 Exhibition "Women in Mathematics" at the Ghent Analysis and PDE Center

During the Summer School "Modern Problems in PDEs and applications", our Ghent Analysis and PDE Center hosted the exhibition "Women of Mathematics from around the world", brought to us by Prof Sylvie Paycha (Potsdam University).

In this framework, Prof Sylvie Paycha delivered the talk "Women in mathematics from around the world: A gallery of portraits". See the picture below.

One of the valuable works of Prof Sylvie Paycha related to women of mathematics can be found on the website womeninmath.net

Our Ghent Analysis and PDE Center is proud to take part in these activities. In particular, see our own project on Women in Analysis and PDE:

https://analysis-pde.org/women-in-analysis-and-pde/

5.4 Problem of the week

Ali Imad Raad (ali.imadraad@kuleuven.be) runs a "Problem of the week", send an e-mail to be put on the mailing list to receive this weekly in your mailbox.

5.5 Modern mathematics. An international movement?

Dirk De Bock (KU Leuven) edited a new publication in the History of mathematics education series of Springer Cham: *Modern mathematics. An international movement?*, doi: 10.1007/978-3-031-11166-2

5.6 Adhemar's corner

Next follow two reviews by Adhemar. The first one is on a reprint of a book about optimization problems and methods to solve them, discussed in their historical context. The second review is on a collection of mathematical puzzles from Japan's puzzle master Tadao Kitazawa.

When least is best by *Paul J. Nahin*, Princeton University Press, 2020 (392 p.), isbn: 9780691218762.

This is an accessible discussion of the mathematics that are used throughout history to solve all kinds of optimization problems. In 2007 a paperback edition appeared introducing some extra optimization problem in the preface. Selecting the book as a volume in the wonderful Princeton Science Library series is most welcome. In the preface for this new edition, Nahin again adds a new problem that he always regretted not to have included in the original version (2004).

This problem is illustrative for some of the problems discussed in this book. Given are two points (2 cities) A and B in a plane at a positive distance from a line R (a river) and a point P (pump station) on R. Find the (the position of P giving a) minimal sum of the lengths AP + PB (the length of the pipelines needed). It is in fact the same as what is in chapter one called the Huygens problem. What is new is that the minimal length can be obtained without knowing the position of P. The latter can only be obtained by numerical approximation.

The problem is easy to understand, requires only basic mathematical techniques, its analytical solution is not trivial, but becomes much simpler when using a clever trick, and it is not completely detached form reality. Relation to a real problem is not unimportant because historically new methods and even new mathematics were invented when previous knowledge did not suffice to solve a new realistic problem.

That first chapter serves as an introduction, illustrating with several minimization problems how stationary points connect to vanishing derivatives, but that there are also non-differentiable problems. From chapter two on, the historical evolution is followed, starting with antiquity. The Dido problem (find the largest area enclosed in a closed curve of given length) and related problems (think of fractals where a finite area has an infinite perimeter) are discussed.

The Middle Ages are represented by several problems among which the Regiomontanus problem (what is the optimal distance to look at a painting on the wall to maximize the viewing angle). Then the 'war' between Fermat and Descartes over Snell's law in optics is explained. It illustrates that these algebraists were very close to describe what became later calculus when Kepler, Newton and Leibniz studied gravity and motion. So far, all these problems were considered and solved (at least historically) without calculus. Obviously, with calculus available, derivatives became an important tool to solved them. Galileo studied gravity and the Bernoulli brothers investigated the brachistochrone problem (find the curve of fastest descent between two given points), which is considered to be the first variational problem like the catenary problem (hanging chain) and minimal area surfaces (that generalizes the Dido problem).

In the final chapter, all types of optimization problems are introduced inspired by practical problems from our time like finding the optimal location of a distribution centre, the best configuration of railway tracks, the travelling salesman problem, etc. These require new solution methods like linear and dynamic programming.

Besides the interesting historical framing of the problems and their interplay with the development of mathematics, Nahin takes his time to explain all the formulas and mathematics to solve the problems. It is remarkable that all of this needs little more than some basic calculus. The text has several inserts giving solution to extra problems, or historical quotes. There is no list of references, but the reader is regularly referred to papers that studied some of the historical solution.

This book can be classified as a popular science book, but unlike the effort of many author to ban all formulas, in order not to decimate the number of readers, Nahin includes all the witty mathematics to actually solve the problems, and because the problems are often formulated as one that triggers the puzzling instinct (how to make a perfect basketball shot, what is the best way to get out of the wood when lost,...), the genuinely interested reader will read this book almost as a page turner.

It is very fortunate and actually only a just decision that Princeton picked this book as one in their Princeton Science Library which can be seen as a true quality mark. It is indeed an inexpensive must-read for a broad professional and general audience written by a true master of the genre.
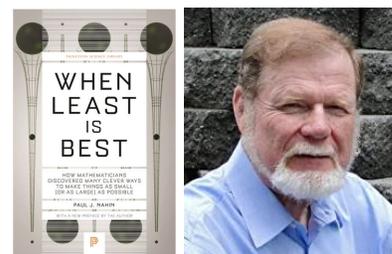
Adhemar Bultheel

Arithmetical, Geometrical and Combinatorial Puzzles from Japan by *Tadao Kitazawa*, MAA/AMS, 2021 (xii+184 p.), isbn: 978-1-4704-6736-4. Edited by A. Liu and G. Sicherman

Tadao Kitazawa, member of the Japanese Academy of Recreational Mathematics, is a puzzle designer who has published many puzzles in Konwakai News. The editors of this book have collected many of his puzzles and organized them in this collection while Kitazawa has added several new formats.

As announced in the title, there are three parts collecting problems of arithmetical, geometrical or combinatorial nature. Each part consists of several chapters that contain puzzles of a certain format or concept, followed by answers and sometimes also solutions, if the answers need more explanation.
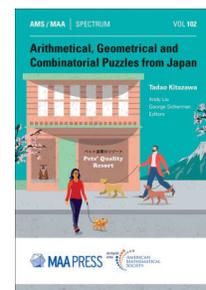
The book starts with an interview of Kitazawa and when asked what his favorite puzzle is, he refers to his 'tower squares' puzzles. Its idea is a bit like a sudoku where you have to fill an $n \times n$ square grid where each row and column must contain the numbers 1 to n exactly once. In the tower squares the numbers that have to appear in every row and every columns are one times 1, two times 2, three times 3, etc. so that n can only be 1,3,6,10,... $n = 1$ is trivial and for $n = 3$ there are only 12 different solutions. The sizes 6 and 10 are most common. No numbers are given, and the player has to fill the grid with n^2 numbers. The n^2 little squares that from the grid are formed by $(n + 1)n$ vertical borders of length 1 and as many horizontal ones. The outer borders of the big square are drawn in black, thus leaving $(n - 1)n$ vertical and as many horizontal boundaries drawn in light grey. Some of these are drawn in black too and the constraining rule is that on both sides of such a black border the same numbers must appear. A trivial example of a 3×3 square with a unique solution has 4 black borders for its NE and SW squares and no other.

Kiwazawa has a special preference for puzzles involving grids. There are for example grids where some of the borders are matchsticks or toothpicks generating a graph representing some geometrical shape and the problem is to move a small number of these matchsticks and obtain a figure that has certain symmetry properties, or that consists of two identical polygons. Even the arithmetical puzzles are sometimes formulated in grid form. Take for example an $n \times 5$ grid where for example the first row has the 5 symbols "$1 + 2 = 3$" the remaining rows are filled up with similar simple expressions such as $8 - 5 = 3$ or $2 \times 4 = 8$ etc. Next the grid is cut up in L-shaped pieces of 3 grid squares. The player then is given all these pieces and has to put this puzzle back together such that all the sums are correct.

Other puzzles are like tangrams with specific rules about allowed rotations or reflections. Origami type puzzles require to fold paper such that coloured parts fit together to form a certain shape after folding. In the combinatorial part one has to move chess-like pieces on a grid to move them from a starting configuration to a target one.

A type of puzzles that are simple to state, but that can be rather challenging to solve goes as follows. For example if the solution of the puzzle is that 136 is a multiple of 68, then all you get is the row if numbers 16386. The solution is to be found by moving 1, 3 and 6 to a second row, leaving the 6 and 8 on the top row. Thus, given a sequence of digits, move some of them to the second row, so that the number that appears on the second row becomes a multiple of the number that remains on the first row. Variants are possible like the answer $16 \times 3 = 48$ which has to be extracted from the sequence 16438. Move 4 and 8 to row 2 leaving 16-blank(s)-3 on the first.

This collection of puzzles is refreshingly original, and some have indeed some Japanese flavour. The degree of difficulty is varying, but no specific education is needed. This will guarantee many hours of puzzling pleasure. A single authored mathematical puzzle book with so many different formats and variations is exceptional in Japan and even outside Japan. Some exceptions are the *Puzzles 101: A puzzlemaster's challenge* by Nobuyuki "Nob" Yoshigahara (A K Peters, 2004) and *The puzzles of Nobuyuki Yoshigahara* (Springer, 2020). The latter are also edited by the editors of the present book helped by Nob's son.　　　　　　　　　　　　　　　　　Adhemar Bultheel

ALTAÏR

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30 septembre 2023: **José Halloy** (Université Paris Cité) Technologies zombies ou comment prendre au sérieux la soutenabilité forte

14 octobre 2023: **Christine De Mol** (ULB) Éloge de la parcimonie : de l'imagerie mathématique aux réseaux de neurones

25 novembre 2023 : **Etienne Decroly** (CNRS) Ouvrir la boite de Pandore des expériences à risque en virologie

9 décembre 2023 : **Jean Doyen** (ULB) Les nombres premiers, les graphes aléatoires et le meilleur des mondes selon Leibniz

10 février 2024 : **Karine Van Doninck** (ULB) L'évolution changera la façon dont vous verrez le monde

23 mars 2024 : **Olivier Hamant** (ENS Lyon) La troisième voie du vivant
Cette conférence aura lieu en ligne

20 avril 2024 : **Sébastien de Valeriola** (ULB) De la théorie des graphes à l'analyse des réseaux, une approche quantitative de l'histoire

Horaire : le samedi matin de 10h à 11h30
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