Newsletter

By Andreas Weiermann

Contents

Foreword by the president of the BMS

Dear colleagues,

We are pleased to share with you the latest edition of our Newsletter, which, as always, contains information about the activities of the Belgian Mathematical Society as well as updates from the broader mathematical community.

I would also like to take this opportunity to inform you that we are already planning more activities for the upcoming academic year. In particular, in collaboration with the Royal Dutch Mathematical Society and the Luxembourg Mathematical Society, we are organizing the next edition of the BeNeLux meeting. As you can see under the "Conferences" section on our website, similar events took place in 1996, 2005, and 2016. This has almost become a ten-year tradition, and the next edition will be held in Antwerp on April 7-8, 2026. Please save the dates - we will share more details in future newsletters.

For now, we hope you enjoy reading this newsletter, and I look forward to seeing many of you at our Young Scholar Day in Leuven on June 3!

Best wishes,
Joost

1 News from the BMS & NCM

1.1 Jacques Tits Chair 2025

The call for applications for the second Jacques Tits Chair of the BMS is now open. The deadline for applications is March 31, 2025. See all information at the end of this newsletter and on the website https://bms.ulb.ac.be/bms-prizes/.

1.2 Young Scholar Day 2025

The BMS will organize its "Young Scholar Day" on Tuesday June 3 2025 on the KU Leuven campus, rooms 'MSI' (Mgr. Sencie Instituut). The aim of this event is to give the opportunity to early career researchers in Belgium to meet and present their results during short talks. Furthermore, the 2025 Godeaux lecture will be given at the beginning of the event. All information will be made available on https://bms.ulb.ac.be/conferences/young-scholar-day-2025/.

1.3 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.

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

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

2.1   March 2025

EoS Miniworkshop

14 March 2025, KU Leuven

This miniworkshop is held jointly by the Geometry and Analysis Research Teams of the ULB, KU Leuven and UAntwerpen and is funded by the Excellence of Science grant "Beyond Symplectic Geometry". This workshop will take place on Friday, March 14, 2025 at KU Leuven. The main aim is to give the junior members of all three groups the chance to meet each other and hear about their research. More information and the registration link can be found on the workshop webpage below.

https://www.uantwerpen.be/nl/personeel/sonja-hohloch/private-webpage/excellence2-of-scien/miniworkshops/

Program overview:

- 10.30h – 11:30h: talk by Marco Usula (ULB)
- 12:00h – 13:00h: talk by Tobias Henriksen (UA)
- 13.00h – 14:15h: Lunch break
- 14.15h – 15:15h: talk by Maxime Weytens (ULB)
- 15:45h – 16:45h: talk by Senne Ignoul (UA)

Mathematics Research Day

26 March 2025, UAntwerpen

We would like to invite you to the fourth edition of the Mathematics Research Day. At this event, junior researchers from the Department of Mathematics will present their own work. Aspects of a career in and around mathematical research will also be discussed.

The workshop takes place on Wednesday, March 26, 2025 between 13:30-18:00h in the Auditorium M.G.010 in Building G on Campus Middelheim of the University of Antwerp. More information and how to register can be found on the workshop webpage below.

https://www.uantwerpen.be/nl/departementen/wiskunde/onderzoek/onderzoeksdag-wiskunde/

2.2   April 2025

Global Minds in Pseudo-differential Analysis

14-18 April 2025

https://analysis-pde.org/global-minds-in-pseudo-differential-analysis/

This transformative project focuses on enhancing educational opportunities in Colombia by partnering with prominent Colombian mathematicians. The aim of this project is to impart significant knowledge in the field of pseudo-differential operators to the younger generation. This initiative is part of the Ghent Analysis and PDE Center's commitment to supporting mathematical research in developing countries, particularly in Latin America.

Promotor: Prof. Dr. Michael Ruzhansky (PI), Ghent University.
Co-promotors: Dr. Duvan Cardona (Co-PI), Ghent University
Dr. Marianna Chatzakou (Co-PI), Ghent University

Global South partners:

Prof. Dr. Jairo Hernández (Universidad del Norte, Colombia)
Prof. Dr. Bienvenido Barraza (Universidad del Norte, Colombia)
Prof. Dr. Carolina Neira Jiménez (National University of Colombia)
Prof. Dr. Liliana Posada (Universidad del Valle, Colombia)
ICMAM Latin America (International Community of Mathematicians from Latin America)

2.3   June 2025

Young Scholar Day

3 June 2025, KU Leuven

See all information on https://bms.ulb.ac.be/conferences/young-scholar-day-2025/.

The Spring Meeting of the Dutch-Flemish Scientific Computing Society

13 June 2025, Hasselt University

The Dutch-Flemish Scientific Computing Society is organising yearly a spring meeting, alternating in the Netherlands and Belgium. Young and senior researchers from the Netherlands and Flanders present their recent results. Among the invited speakers one finds PhD students who won one of the three poster prizes awarded at the Woudschoten Conference in the year before.

The 2025 Spring Meeting of the Dutch-Flemish Scientific Computing Society will take place on Friday, June 13th, at
Hasselt University,
Campus Diepenbeek
Agoralaan, Building D
3590 Diepenbeek

Organizing committee: Sorin Pop (Hasselt University), Jason Frank (Utrecht University) and Martine Anholt (CWI, Secretary SCS).

For more information, please, check https://wsc.project.cwi.nl/spring-symposium/2025-meeting.

Further information about the program, speakers and how to register will follow soon.

2.4 September 2025

International Conference on Advanced COmputational Methods in ENgineering and Applied Mathematics (ACOMEN)

15-19 September 2025, Gent

Conference on "Advanced Computational Methods in ENgineering and Applied Mathematics": registration open and call for mini-symposia.

The ninth international conference on "Advanced COmputational Methods in ENgineering and Applied Mathematics" (ACOMEN2025) will be held at the congress center Zebrastraat in Ghent, Belgium from September 15 till September 19, 2025. The conference aims to provide an international forum to present and discuss the latest developments in computational and applied mathematics in various emerging engineering and mathematical fields.

The plenary speakers are

- Peter Bastian (Universität Heidelberg)
- Paul Bressloff (Imperial College London)
- Jerome Droniou (University of Montpellier)
- Jan S. Hesthaven (Karlsruhe Institute of Technology)
- Barbara Kaltenbacher (Alpen-Adria-Universität Klagenfurt)
- Michael Klibanov (University of North Carolina at Charlotte)
- Matti Lassas (University of Helsinki)
- Barbara Wohlmuth (Technical University of Munich)

It is a great pleasure to invite you to participate in the conference. Registration and abstract submission are open now. The template and submission form can be found here:

https://cage.ugent.be/acomen2025/abstract.html

Additionally, you may also submit a mini-symposium proposal. A mini-symposium is a session of at least four coordinated presentations on a single topic of substantial current interest in accordance with the scope of the conference. You may submit your proposal by e-mailing us the following details: tentative title, description, contact coordinates of at least four speakers (regular participants may apply to participate in the mini-symposia). We will let you know as soon as possible about the acceptance of your mini-symposium proposal.

A selection of abstracts will be asked to extend to a full research paper and submit for review and possible publication in a special issue of Computers and Mathematics with Applications (IF2023: 2.9). There will also be an extended abstract book in the book series Research Perspectives Ghent Analysis and PDE Center (Birkhäuser/Springer). You can find all further information (about abstract submission, registration, deadlines, location etc) on our conference website. We thank you for your attention and hope to see you at the ACOMEN2025 conference.

Michael Ruzhansky, Marián Slodička, Karel Van Bockstal (local organising committee)

The Woudschoten Conference (Dutch-Flemish Scientific Computing Society)

24-26 September 2025

The Woudschoten Conference is the pride of the Dutch-Flemish Scientific Computing Society. Organised since 1976, this conference is an established tradition in numerical mathematics in the Netherlands and Flanders. It has featured many of the great names in the numerical analysis and scientific computing, having provided an introduction to and overview of groundbreaking developments in the field. The conference is attended by essentially all Dutch and Flemish researchers in numerical analysis and scientific computing, from PhD students to full professors, and including researchers active in the industry. It has a unique format, dedicated to three topics of actual interest, addressed each by two leading experts in the field. Each speaker has two longer lectures, one with a more general/introductory character, the other presenting recent developments in the field. This format and the informal setting of the conference provide insight and inspiration to the Dutch-Flemish numerical-mathematics community, and it plays a central role in retaining coherence in the community. Particularly for younger participants, this conference is an excellent networking opportunity, and opens many possibilities for the future career.

The 2025 Woudschoten Conference is the 49th edition and will be held between the 24th and 26th of September. The topics and speakers are:

Robust Iteration Methods for Non-linear PDEs

- Florian Adrian Radu (University Bergen, Norway)
- Martin Vohralik (Inria, France)

Scientific Machine Learning

- Virginie Ehrlacher (Ecole des Ponts ParisTech, France)
- Felix Dietrich (TU Munich, Germany)

Geometric Integration

- Mathieu Desbrun (Inria, France)
- Elena Celledoni (NTNU, Norway)

Organizing committee:
Marc Gerritsma (TU Delft, chair), Tomasz Tyranowski (Twente University), Victorita Dolean Maini (TU Eindhoven), Benjamin Sanderse (CWI), Sorin Pop (Hasselt University) Jason Frank (Utrecht University) and Martine Anholt (CWI, secretary)

For more information, please, check

https://wsc.project.cwi.nl/woudschoten-conferences/2025-conference

2.5   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

https://analysis-pde.org/seminars/ghent-on-geometric-analysis/

Ghent Methusalem Junior Seminar

https://analysis-pde.org/ghent-methusalem-junior-seminar/

Seminar of Analysis and PDE

https://analysis-pde.org/seminars/

Ghent Methusalem Colloquium

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

3 PhD theses

Categorical-Algebraic Conditions in Semi-Abelian Categories

Corentin Vienne
UCLouvain
11 March 2025, UCLouvain

<u>Thesis advisors</u>: Prof. Dr. Tim Van der Linden (UCLouvain) and Prof. Dr. Xabier García-Martínez (UVigo)

<u>Summary</u>:

This thesis explores and studies several categorical conditions within the semi-abelian framework, introducing new concepts and deepening the understanding of existing ones. We examine the hierarchy of intermediate conditions separating semi-abelian and abelian categories, highlighting distinctions through examples and counterexamples.

A key contribution is the notion of representability of representations, which is shown to characterise Lie algebras within varieties of non- associative algebras. Similarly, the associativity of the cosmash product is studied, showing that it uniquely characterises commutative associative algebras within the same framework.

Arithmetical categories, traditionally studied in Barr-exact Mal'tsev contexts, are revisited in the semi-abelian setting. Protomodularity appears as an important component in characterising arithmetical semi-abelian categories as those without non-trivial abelian objects. This perspective allows for new insights into the behaviour of Higgins commutators in these categories.

Lastly, the category HSLat of Heyting semilattices is investigated. Its categorical-algebraic features, such as commuting subobjects or normal subobjects, are analysed to establish conditions like algebraic coherence or action accessibility. Serving as an arithmetical category satisfying transitivity of normality—a new condition introduced in this thesis—HSLat exemplifies the application of results from this work.

Non-associative aspects of algebraic groups

Jari Desmet
UGent
Date TBA (end of May)

<u>Thesis advisor</u>: Prof. Dr. Tom De Medts (UGent)

<u>Summary</u>:

In this thesis, we explore algebraic groups as automorphism groups of finite-dimensional non-associative algebras in two different contexts.

Simple algebraic groups over an algebraically closed field can be classified (up to quotients or extensions by finite central subgroups) into four infinite families, and five other, so-called exceptional, cases

written G_2, F_4, E_6, E_7, and E_8. The exceptional groups and non-associative algebras share a long history together. For example, the groups of type G_2 are precisely the automorphism groups of octonion algebras, a class of 8-dimensional non-associative algebras, and the groups of type F_4 are precisely the automorphism groups of Albert algebras, an already more complicated class of 27-dimensional non-associative algebras (so-called exceptional Jordan algebras). A similar description of arbitrary groups of type E_6, E_7 and E_8 is much less straightforward.

In the first part of this project, we investigated Chayet–Garibaldi algebras, a class of commutative non-associative algebras constructed in 2021 to find a similar description for E_8, though the construction outputs an algebra for any absolutely almost simple algebraic group. In the thesis, we manage to describe the Chayet–Garibaldi algebras of types G_2, F_4, E_6 and E_7 in terms of their natural representations, the smallest non-trivial representation (which is not the Lie algebra). We also describe the action of a maximal torus on the Chayet–Garibaldi algebras, and identify an interesting family of idempotents, related to the second part of the PhD project.

The second part of this thesis concerns so-called *primitive axial algebras of Jordan type* $\frac{1}{2}$. These are non-associative algebras, introduced in 2015 by Jonathan Hall, Felix Rehren and Sergey Shpectorov, that mimic the behaviour of idempotents in Jordan algebras (i.e. the Peirce decomposition). More specifically, primitive axial algebras of Jordan type $\frac{1}{2}$ are commutative non-associative algebras generated by idempotents a such that their multiplication operators L_a are diagonalizable with eigenvalues $\{1, 0, \frac{1}{2}\}$, such that the fusion laws $V_1 = \langle a \rangle$, $V_0^2 \subseteq V_0$, $V_0 V_{\frac{1}{2}} \subseteq V_{\frac{1}{2}}$ and $V_{\frac{1}{2}}^2 \subseteq V_0 \oplus V_1$ hold, where V_λ is the λ-eigenspace of L_a.

Until recently, the only known examples were Jordan algebras and algebras related to 3-transposition groups, called Matsuo algebras. By analyzing their automorphism group and their derivations, we establish that general primitive axial algebras of Jordan type $\frac{1}{2}$ are a certain mixture of Jordan algebras with 3-transposition groups, and that Jordan algebras are precisely those with a large automorphism group while Matsuo algebras usually have finite automorphism groups. Moreover, we produce an infinite family of examples of primitive axial algebras of Jordan type $\frac{1}{2}$ that are neither Jordan nor Matsuo.

4 Job announcements

4.1 From VUB

Two parttime faculty positions (10% each) have been opened in the department of Mathematics and Data Science at the Vrije Universiteit Brussel, in the domain Statistics and Data Science. Both positions come with a teaching duty of one course (6 ECTS). One of the courses is mathematical statistics in the bachelor curriculum of Mathematics and Data Science, the other course is a course to be developed for the master curriculum in Mathematics. The course **Mathematical Statistics in the bachelor program has to be taught in Dutch**. The master course can be taught in English.

The vacancy with teaching duty in the bachelor program is: https://jobs.vub.be/job/Elsene-Professor-Wiskunde-en-Data-Science/1175544501/

The vacancy with teaching duty in the master program is: https://jobs.vub.be/job/Elsene-Professor-Wiskunde-en-Data-Science/1175543301/

It is of course possible to apply for both positions, both positions can be combined. In case someone is

interested in both positions, application for both positions is necessary.

Deadline for applications is March 30, 2025.

5   News from the universities and other societies

5.1   SteFFesT 2.0

On March 5, 2025, a workshop was held at the Vrije Universiteit Brussel in honor of Stef Caenepeel on the occasion of his "second retirement".

Stef has been a highly active member and former president of the Belgian Mathematical Society. Currently, he serves as the editor-in-chief of our Bulletin, where he oversaw its transition to a fully electronic journal. Since October 2021, he has been a professor emeritus at the Vrije Universiteit Brussel, but he continued to hold a 10% position until the end of last academic year - hence the "second retirement".

Of course, anyone who knows Stef won't be surprised that he worked far more than 10% over the past years. He has even promised to keep up the same pace in the future, giving us hope for a SteFFesT 3.0 down the line!

The workshop featured lectures by some of his close friends and colleagues: Claudia Menini (Ferrara), Serban Raianu (Bucharest), and, of course, Fred Van Oystaeyen (Antwerp), Stef's former PhD supervisor. The day concluded with warm greetings and fond memories shared by his former PhD students, followed by a beer tasting and a dinner, a moment captured in the picture below.

We wish Stef all the best in the years to come and sincerely thank him for his many years of dedication and hard work!
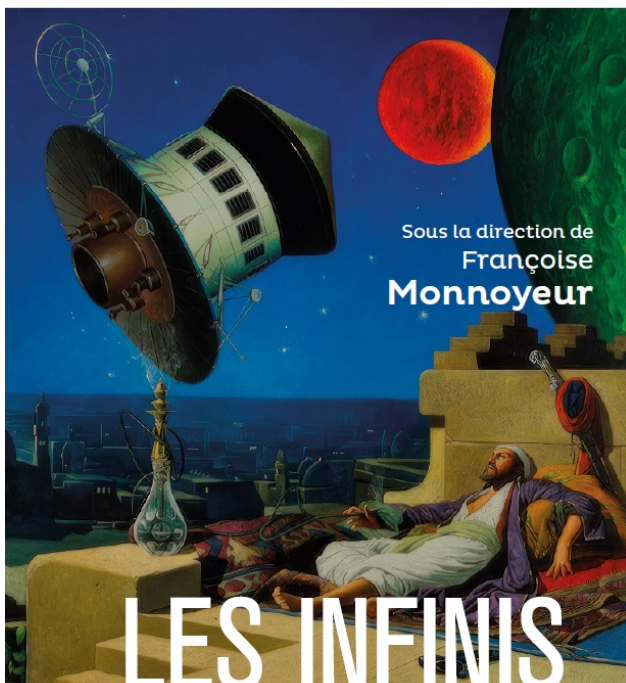
6   History, maths and art, fiction, jokes, quotations ...

6.1 π-day

Many thanks to Paul Levrie for a contribution about π-day, which we celebrate on March 14, see at the end of this newsletter.

6.2   Les infinis : Astronomie, Mathématiques, Philosophie

Le livre collectif et interdisciplinaire sur l'infini : Astronomie, Mathématiques, Philosophie est publié.

Sous la direction de
Françoise Monnoyeur

Les infinis. Astronomie, mathématiques, philosophie

Dès le IVᵉ siècle av. J.-C., Aristote tente de définir les différents aspects de l'infini. Il distinguait l'*infini actuel*, auquel il déniait toute réalité, de l'*infini potentiel*, auquel il accordait une existence mathématique. Mathématiciens, philosophes et astronomes n'ont cessé depuis de revisiter ces deux expressions au gré de leurs conceptions théologiques ou artistiques. Bruno, Descartes, Pascal et Leibniz concluent que le monde est dépendant de l'infini actuel, dont les théologiens avaient fait le domaine exclusif de Dieu ; Bolzano et Cantor, eux, théorisent pour la première fois l'existence d'un infini actuel en mathématiques.

Au cours des siècles, tous se sont donné les moyens intellectuels, institutionnels et techniques de prouver l'existence de l'infini en dehors de tout contexte religieux. Cependant, et malgré l'importance et le nombre de leurs découvertes, l'ancienne question, celle de savoir si le cosmos infini existe ou pas, demeure toujours irrésolue.

Françoise Monnoyeur est Associate Professor à l'université de Linköping (Suède) chercheur associé au Centre Jean Pépin (CNRS) et enseignante en philosophie des sciences contemporaines à IMBTS.

15 € prix valable en France
ISBN : 978-2-271-13951-1

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www.cnrseditions.fr

Erró, *Sur la terrasse (Fès)*, 1976. Collection
Catherine Bret-Brownstone, Paris
© Adagp, Paris, 2023.

Maquette: SYLVAIN COLLET

Sommaire

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6.3   Adhemar's corner

This newsletter's review by Adhemar is on a fun cartoon book to introduce mathematical concepts for the laymen, *Math with bad drawings* by B. Orlin.

Math with bad drawings, *Ben Orlin*. Black Dog and Leventhal, 2018 (376 p.), isbn: 978-0316509039. **Wiskunde is overal**, Lannoo, 2019 (367 p.), isbn: 978-9401459297.

Ben Orlin

I read this book in the Dutch translation. The title "Wiskunde is overal" (Math is everywhere) is catching the idea that this is another popularizing book on mathematics. The English title refers to the fact that it is amply illustrated with oversimplified cartoons. Showing a head has 2 big eyes and a squiggle as a mouth to express emotions, the body is just sticks. Ben Orlin writes in journals and magazines about mathematics and he is also the brain of a blog with the same title as this book.
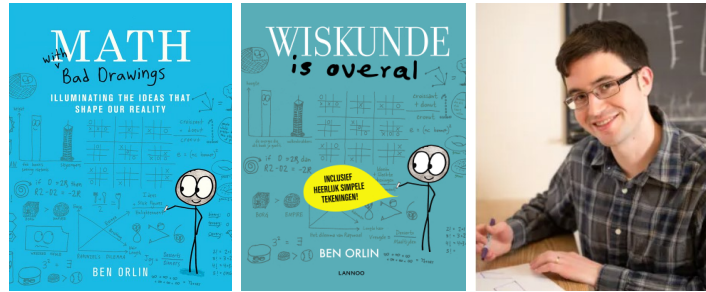
This is not the first book that illustrates with tongue-in-cheek-humor how mathematics is involved in everybody's daily life. Orlin treats his readers as totally illiterate about mathematics (he spends quite some time to explain the difference between discrete data and continuously varying variables) but readers are otherwise assumed to be smart enough to understand rather complicated constructs populating the stock market, they should be interested in voting systems, insurance contracts, job interviews, and sports, in short, an average adult.

The book starts with a game (according to Orlin, that is where all mathematicians start). Tic-tac-toe is very simple and boring, but what if you change the rules and make it more complex, then it can become instantly interesting. That is also what happens in mathematics. He then continues by explaining how different groups of people experience mathematics: pupils, mathematicians (average ones and the best), scientists and applied mathematicians, and how they should communicate. This concludes part 1: Thinking like a mathematician.

A second part treats the general topic of "design" and has several applications, starting with applications of geometric ideas. Stress in a loaded beam leads to the I-beam and the design of different kinds of trusses. It is explained why A4 paper format is designed in a ratio of $\sqrt{2}$. The effect of dimension: double the size and the surface multiplies by 4 and the volume by 8. This explains why giants cannot exist, why babies need a blanket, and why ants survive a fall from big heights, but drown in water, and it solves the Olbers's paradox: why it is dark at night if our universe has infinitely many stars. On another level, it is explained how to design a fair die (and how it can be loaded). Finally there is a somewhat longer discussion between Dart Vader and his advisors about how they arrived at the spherical structure of the death star as an optimal one.

In the remainder of the book probability and statistics plays an important role. Part 3 about probability first deals with lotteries: why do people do it if they are almost certain to loose money. Different ways to participate and the psychology behind it, and how tax paying is a kind of participating in a lottery organized by the state, that can only gain by organizing it. Somewhat similar is the idea of insurances, what is the underlying mechanism that reduces the risk. How much can you gain by buying an insurance, and what are the risks of selling them. What is fair in advising or forcing insurance on the population by politicians? Binary coin tossing is applied to the properties inherited from your parents, grand parents etc. This part ends with an
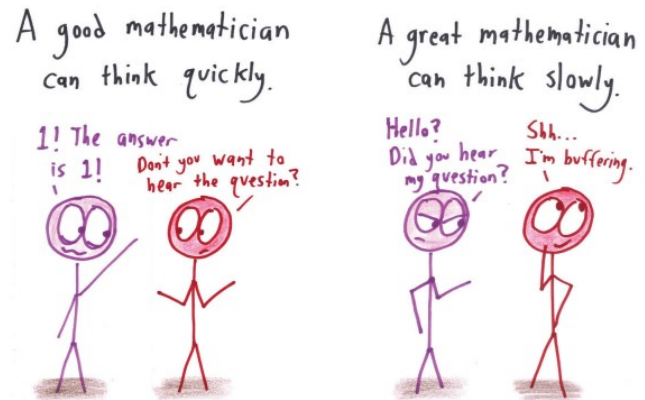

©Ben Orlin
Typical Orlin cartoon.
Death star and Darth Vader

explanation of the 2008 worldwide financial crisis.

Part 4 is dealing more particularly with statistics. Several ways to characterize statistics distributions are defined: mean, median, mode, percentile, percent difference, range, variance and standard deviation, correlation coefficient. What do they mean, when are they used, and what are their deficiencies? There is also a chapter on statistics as they are applied in baseball. How the rules were adapted because of statistics, and other changes. The problem of false positives or negatives and outliers lead to Bayesian statistics. Much depends on what and how something is measured: the number of clicks on a website, how to define the best teacher or salesmanager, or how to decide when someone is poor or rich? What can be derived by analysing the digitized texts of novels? Can you recognize an author, or the gender of the author, or deduce a masterpiece from junk literature?

The final part 5 has a vague subject of "turning points". It starts with a chapter on pricing systems. Why is a piece of compressed carbon, also known as diamond, so much more expensive than life saving water? Therefor is a theory of Léon Walras who defined the marginal theory of value and (along with William Stanley Jevons and Carl Menger) the general theory of equilibrium. This is also applied to the tax brackets. These different levels are a form of discretisation of a continuous variety on possible income. It is explained

©Ben Orlin

that by introducing more of these levels, one approaches a continuous progressive system. Somewhat similar is the American voting system of the winner-takes-it-all result in so-called red, blue, and swing states. And at the end we learn about chaotic systems or at least situations where prediction is difficult. We meet the double pendulum, the game of life by Conway, and fractals. These are however treated only briefly.
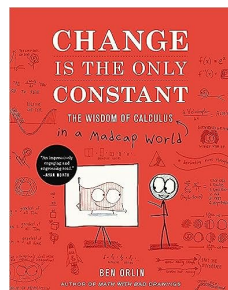
The book has an appendix with notes, references, and jokes that are too strange or would be disrupting the main text when included there.
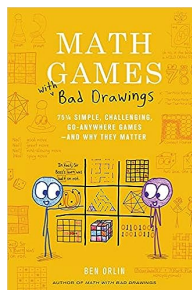
Math games with bad drawings (2022)

Change is the only constant (2019)

Tr.: Wat een hond ons over wiskunde kan leren (2021)

It is a bit unfortunate that much of the examples are related to the US (voting system, baseball, taxes,...). Nevertheless, this is a quite funny book about mathematics without ever including the mathematics itself. It gives a much broader view, placing the application of the math in the context where it is applied. That also includes economic, mechanical, political, social, behavioural, and even psychological aspects. Sometimes unexpected links and parallels are made between seemingly unrelated topics. The mathematician will not learn much, but I would highly recommend this for a non-mathematician who would like to learn how and where mathematics is used, without having to go through the burden of learning the mathematics.

To conclude, I would like to mention that Ben Orlin has published two other books in a similar style: *Change is the only constant* (translated in Dutch as *Wat een hond ons over wiskunde kan leren*) and most recently *Math games with bad drawings*. Adhemar Bultheel

π trivia 2025

Did you know that . . .

- π today is **π-day**? Why? Because in the American notation, the date March 14 is written as 3/14 and 3.14 is an approximation of the number π.
- π . . . you have to eat pie today, or even better: take loads of pie with you to work?
- π . . . the number π is the ratio of the circumference of a circle to its diameter, but also the ratio of the area of that circle to the square of its radius?
- π . . . since 26 November 2019:

- π . . . the first 500 decimal digits of the number π are:

  3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211706798214808651328230664709384460955058223172535940812848111745028410270193852110555964462294895493038196442881097566593344612847564823378678316527120190914564856692346034861045432664821339360726024914127372458700660631558817488152092096282925409171536436789259036001133053054882046652138414695194151160943305727036575959195309218611738193261179310511854807446237996274956735188575272489122793818301194913

- π . . . the following expression from a book from 1593 is a formula for the number π?
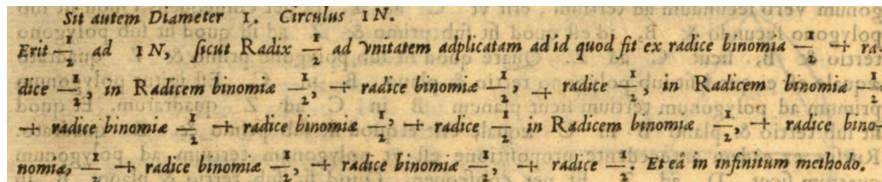
  (Its author clearly likes what he sees.)

- π . . . both of these formulas are true?

  $$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} + \ldots \qquad \Big| \qquad \frac{\pi}{4} \cdot \sqrt{2} = 1 + \frac{1}{3} - \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \frac{1}{11} - \frac{1}{13} - \frac{1}{15} + \ldots$$

- π . . . the well-known approximation for π that uses only 2 different digits, namely $\frac{22}{7}$, is spectacularly inferior to the following formula by the Indian mathematician Srinivasa Ramanujan?

  $$\frac{22}{7} = 3.1428571\ldots \quad \text{but} \quad \frac{9}{5} + \sqrt{\frac{9}{5}} = 3.1416407\ldots$$

- π . . . the mathematician Benjamin Peirce (1809-1880) was surprised in 1864 by the formula on the left which shows that a complex power of a complex number can give a real result?

  $$\mathrm{i}^{-\mathrm{i}} = \sqrt{\mathrm{e}^{\pi}} \qquad \Big| \qquad \mathrm{e}^{-\mathrm{i}\pi} = -1$$

  Peirce said about it to his students: *Gentlemen, we have not the slightest idea what this equation means, but we may be sure that it means something very important.* He also said this, it seems, about the other formula: *Gentlemen, that is surely true, it is absolutely paradoxical; we cannot understand it, and we don't know what it means. But we have proved it, and therefore we know it must be the truth.*

- π . . . the record of calculating digits of the number π was broken again in 2024? Two improvements since π-day 2024: $105\,000\,000\,000\,000$ decimal places on March 14 (π-day), and $202\,112\,290\,000\,000$ decimal places on June 28 (τ-day;-). Twice by the same data storage company. They used the formula on the left:

  $$\frac{1}{\pi} = 12 \sum_{n=0}^{\infty} (-1)^n \frac{(6n)! \cdot (545140134n + 13591409)}{(n!)^3 \cdot (3n)! \cdot 640320^{3n+3/2}} \qquad \Big| \qquad \frac{4^{16}}{\pi} = \sum_{n=0}^{\infty} \frac{(2n)!^3 \cdot (42n+5)}{(n)!^6 \cdot 2^{12n}}$$

  Each additional term of this infinite sum gives 14 additional digits. This series is related to the one on the right, again by Srinivasa Ramanujan. This last formula has obtained the status of FF (Famous Formula) since it was

used in the Disney movie High School Musical, which is set in a school. In one of the scenes from the movie, the formula in question is written on the blackboard and one of the students asks the teacher: "Shouldn't that second equation read: 16 divided by π?". Whereupon the teacher takes out her calculator, starts calculating, and corrects the error.

π ... e (= 2.718281828...) knots is a good approximation for π miles per hour? (Thank you xkcd and Cris.)

π ... two Indian physicists, Arnab Priya Saha and Aninda Sinha of the Indian Institute of Science, both string theory researchers, accidentally discovered a new formula for the number π in 2024:

$$\pi = 4 + \sum_{n=1}^{\infty} \frac{1}{n!} \cdot \left(\frac{1}{n+l} - \frac{4}{2n+1} \right) \cdot \left(\frac{(2n+1)^2}{4(n+l)} - n \right)_{n-1}$$

Here the expression $(a)_{n-1}$ has to be interpreted as the product $a(a+1)(a+2)\ldots(a+n-2)$. The "l" that occurs in the formula is a (positive) parameter, which may be chosen freely. This formula is original in the sense that no other formulas for π are known that have a form similar to this one.

π ... stand-up mathematician Matt Parker attempted to break the record for calculating π by hand in 2024? That record was (is) held by William Shanks, who got to 707 decimal places in 1873. It wasn't until 1946 that it turned out that only 527 were correct, and he had already found those in 1853. Shanks used John Machin's formula:

$$\frac{\pi}{4} = 16 \cdot \arctan \frac{1}{5} - \arctan \frac{1}{239}$$

in combination with the following infinite series for $\arctan \frac{1}{m}$:

$$\arctan \frac{1}{m} = \frac{1}{m} - \frac{(\frac{1}{m})^3}{3} + \frac{(\frac{1}{m})^5}{5} - \frac{(\frac{1}{m})^7}{7} + \frac{(\frac{1}{m})^9}{9} - \cdots$$

Matt Parker thought he could do better by working with a whole team of calculators (400), and with a formula that converges faster:

$$\frac{\pi}{4} = 1587 \arctan \frac{1}{2852} + 295 \arctan \frac{1}{4193} + 593 \arctan \frac{1}{4246} + 359 \arctan \frac{1}{39307}$$
$$+ 481 \arctan \frac{1}{55603} + 62 \arctan \frac{1}{211050} - 708 \arctan \frac{1}{390112}$$

Using this formula 7 teams of calculators can work in parallel. However, the Shanks record was not broken, 139 decimals were calculated.

π ... AI and π apparently go well together? *The Ramanujan Machine* is (kind of) an AI mathematician. Since 2021, this computer program has been generating continued fractions for the best-known mathematical constants, including of course π. The proof that the generated formulas are correct is left to the real mathematicians. This is such a formula:

$$\frac{24}{\pi^2} = 2 + 0 \cdot 14 + \cfrac{8 \cdot 1^4}{2 + 1 \cdot 14 + \cfrac{8 \cdot 2^4}{2 + 3 \cdot 14 + \cfrac{8 \cdot 3^4}{2 + 6 \cdot 14 + \cfrac{8 \cdot 4^4}{2 + 10 \cdot 14 + \ddots}}}}$$

(where the multiples of 14, the numbers 0, 1, 3, 6, 10, are the triangular numbers).

π ... there is a wealth of information about π in the OEIS (Online Encyclopedia of Integer Sequences)? For example, a sequence of numbers that starts like this:

$$1, 16470, 44899, 79873884, 711939213, 36541622473, 45677255610, 62644957128, 656430109694, \ldots$$

If we take an arbitrary term from this sequence, for example 44899, then you can be sure that the 5 digits of π from the 44899th on, are given by 44899. (Thank you, Stijn.)

π ... there are quite a few nice quotes about π (from mathematicians of course)?

If π wasn't around, there would be no round pies! (Paul J. Nahin)

It can be of no practical use to know that π is irrational, but if we can know, it surely would be intolerable not to know. (Edward Charles Titchmarsh)

(2025 - see also `http://www.eoswetenschap.eu/wiskunde-sexy/`)

BMS Jacques Tits Chair

The BMS Jacques Tits Chair is a yearly prize established by the BMS board in 2023 in honor of the late Jacques Tits (1930-2021). Its purpose is to invite an internationally recognized mathematician, working in any field of Mathematics, to spend one month at a Belgian university.

Rules of the prize:

- Each (academic) year, the BMS board decides on the timeline for the prize. For the 2025-26 chair, the schedule is as follows:

  - The call for applications is launched in January 2025.

  - The deadline for applications is March 31, 2025.

  - The decision will be made and announced by the BMS board in May-June 2025.

- Any permanent member (or group of permanent members) of a department of Mathematics at a Belgian university may propose a candidate for the chair. This individual is hereafter called the *host* and their institution the *host university*. The BMS encourages each department to discuss proposals internally and to nominate only one candidate per university.

- The winner of the chair will be invited by the host to spend one month at the host university. During this stay, the chair holder can collaborate scientifically with the host and will give an advanced mini-course. The first lecture of this mini-course, called the "inaugural lecture", should be accessible to a broad mathematical audience.

- The host (or host department) is responsible for organizing the mini-course and the inaugural lecture. The BMS will use its communication channels to advertise these events. Details of the events must be communicated to the BMS at least three months in advance. Participation at the events should be for free of charge for BMS members.

- The BMS will cover travel and accommodation expenses of the chair holder, up to a maximum of 3500 EUR. The host will assist in finding suitable accommodation for the chair holder.

- The BMS will cover expenses for organizing a reception following the inaugural lecture, up to 2000 EUR.

- The chair holder will receive a prize of 2000 EUR from the BMS.

- The host university is expected to offer the chair holder a suitable workspace and access to university facilities.

- To nominate a candidate, the host must send the following documents to the email address bms@ulb.be by the specified deadline:

  ○ A short CV of the candidate, including a full publication list, positions, grants, awards and the candidate's contact information.

  ○ A support letter of the host (maximum 2 pages), highlighting the candidate's merits, the potential for scientific collaboration during the visit, and the proposed topics for the mini-course and inaugural lecture.

- The decision on the winner is made by the BMS board based on the candidate's scientific excellence, the opportunities for scientific collaboration with the host, and the relevance of the proposed mini-course and inaugural lecture to the Belgian mathematical community. Researchers working in any field of mathematics are eligible. The BMS board is not obliged to justify its decision and the outcome cannot be contested.

- The BMS reserves the right not to award the prize if no eligible candidates are found or if none of the eligible candidates meet the expected standards.

- The prize cannot be awarded to the same person twice.