Newsletter

BELGIAN MATHEMATICAL SOCIETY

114, September 15, 2017

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

ULB Campus Plaine, C.P. 218/01,
Bld du Triomphe, B-1050 Brussels,
Belgium

Website: http://bms.ulb.ac.be
Newsletter: F.Bastin@ulg.ac.be
Tel. F. Bastin, ULg: (32)(4) 366 94 74

Contents

A promising new academic year...

I hope all of you had a great and productive Summer break. Many of us had to take care of resit exams in the past few weeks and are now getting ready to meet the new generation of maths students. I hope

they will be numerous and eager to discover the beauties of mathematics.

As a Society we can look back at a very succesful joint meeting with the teacher's societies. This three day meeting was held at the Maria-Boodschaplyceum in the center of Brussels and attracted 115 participants. We thank the school and its management for their hospitality and collaboration. Many interesting talks were given and it was a great oportunity to get to know the colleagues who prepare our future students. For those who could not attend the meeting we made slides and abstracts available on the conference website: http://bms.ulb.ac.be/mathconf2017/eng/program.html

Here are some photos of our joint meeting...

Many of us who are involved into all kinds of organisations and societies know how difficult it is to find volunteers for various tasks. It is with great pleasure that I can announce that we found two young and dynamic persons who are prepared to help us.

Peter De Maesschalck has been appointed as a treasurer of the Society during our last board meeting in May. We are very happy with this and thank Peter for adding this task to the important role he is already playing as a secretary of the Society. We want to thank Guy Van Steen for the many years of involvement as a treasurer of our Society.

We also welcome a new editor for our Newsletter. Wendy Goemans has kindly agreed to take over this task from Françoise Bastin. Wendy has already been helping us a lot with this issue and will be fully in charge from the next issue on. You can contact Wendy via wendy.goemans@kuleuven.be. Thank you Françoise for having been our newsletter editor for 15 years and for all your effort in gathering and presenting interesting content issue after issue!

This year the BMS will also continue the tradition of the PhD-days, where PhD students of all over the country come together and present their research. The next PhD day will be held in Gent. More news and details will follow in our next Newsletter.

Finaly we just got the exciting news that Cédric Villani will be awarded a honorary doctorate at the KULeuven. The ceremony will be on the 10th of October. You will find an announcment futher in this Newsletter.

I wish you a nice start of the new academic year and hope that you will enjoy this issue of the newsletter.

Philippe Cara,
BMS president

And remember...

You can follow `BelgianMathS` on twitter and tweet announcements or other interesting information to @BelgianMathS.

We also have a facebook page: https://www.facebook.com/BelgianMathS This page is your page! Please help us to keep it up to date and interesting by sending us nice links and information to Yvik Swan yvik.swan@ulg.ac.be

1 BMS subsidy for initiatives aimed at high school pupils and young mathematics students

1.1 Aim

The Belgian Mathematical Society would like to promote mathematics among high school pupils and undergraduate Math/STEM students. To achieve this we propose to sponsor events and initiatives that address that objective. These initiatives can also be organised for or by high school teachers, whom we see as important for awareness of Mathematics among our younger population.

We also encourage applications for local initiatives (i.e. the proposal does not necessarily have to involve the whole Belgian Mathematics community or not even a whole region). The maximum amount of our subsidy is 500 euros.

1.2 Procedure

Organisers of qualifying events or initiatives can apply by e-mail to bms@ulb.ac.be. Applications can be written in French, Dutch, German or English.

An application should contain at least the following information:

- a brief description (not more than one A4 page) of the initiative, the targeted audience and the aims;
- the (expected) number of participants;
- a report on previous editions (if any);
- other sources of funding (if any, even pending).

1.3 Deadlines

Submit your request by November 1st. BMS decision will be communicated by the end of December.

1.4 Spread the news

Please help us by spreading the information about this new source of funding among your high school contacts and colleagues who are involved in such initiatives!!

2 Meetings, Conferences, Lectures

2.1 October 2017

Coding Theory and Cryptography VII, Contact Forum

October 6, 2017

Paleis der Academiën, Hertogsstraat 1, B-1000 Brussel

See the poster at the end of this Newsletter.

Cédric Villani (Fields medal in 2010) will be awarded a doctorate honoris causa at the KULeuven on October 10th, 2017.

See the invitation letter at the end of this Newsletter.

2.2 November 2017

First Belgium-Chile-Italy Conference in PDEs

November 13-17, 2017

ULB

See information at the address

http://euro-math-soc.eu/event/mon-13-nov-17-0845/first-belgium-chile-italy-conference-pdes

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2.3 December 2017

Hommage to Marcel Berger

December 6-9, 2017

IHES - Bures-sur-Yvette

See the poster at the end of this Newsletter.

2.4 Programme ALTAIR 2017-2018

Cycle de conférences ALTAIR 2017-2018, ULB: voir programme détaillé à la fin de la Newsletter.

3 PhD theses

Local Moufang sets

Erik Rijcken, Gent
June 14, 2017

Thesis advisor: Prof. Dr. Tom De Medts

Summary

In the 1990s, J. Tits introduced the notion of Moufang sets as an axiomatic approach to simple algebraic groups of relative rank one. A Moufang set is a set, along with a class of groups acting on this set, one for each point of the set, satisfying some axioms. For a simple algebraic group of relative rank one, the set consists of the parabolic subgroups, the class of groups are the corresponding root subgroups.

T. De Medts and R. Weiss initiated the study of arbitrary Moufang sets in 2006. Since then, the theory of Moufang sets has been developed more deeply, and many examples of Moufang sets have been described. All Moufang sets we currently know have some algebraic origin, and they all have some underlying 'division structure', where all nonzero elements are invertible. For example: projective Moufang sets can be defined over alternative division algebras, Jordan division algebras give rise to Moufang sets, and every structurable division algebra gives rise to a Moufang set. We can see this division requirement in the constructions of known Moufang sets: inverses pop up everywhere! There are also some Moufang sets which do not arise from algebraic groups directly, but these are still defined over fields (not coincidentally also known as commutative division rings).

One can wonder what happens if we try to define Moufang sets using more general algebraic structures, and this is precisely where my dissertation enters the story. Instead of division structures, I looked at local structures. This means that there can be non-invertible elements in the structure, but they can still be controlled easily. In trying to define the known constructions over local rings and local Jordan algebras, I found a set of axioms that generalize Moufang sets, to local Moufang sets. My

dissertation consists of two major parts. In the first part I develop the theory of local Moufang sets, while the second part contains the constructions of several classes of examples of local Moufang sets.

Universal groups for right-angled buildings

Ana C. Silva, Gent
September 1, 2017

Thesis advisor: Prof. Dr. Tom De Medts

Summary

Buildings were defined by Jacques Tits in the 50's as a means of understanding simple algebraic groups as automorphism groups of some geometric structures. Each building comes with an associated Coxeter group and in this dissertation we are interested in the right-angled case, that is, in Coxeter groups for which every pair ofgenerators either commute or is not related. A right-angled building is then a building whose associated Coxeter group is right-angled.

Trees are examples of right-angled buildings with associated Coxeter groups the infinite dihedral group. In 2000 Marc Burger and Shahar Mozes defined certain groups of automorphisms of regular trees, called universal groups, which act locally as a prescribed finite permutation group. These groups form a large class of simple subgroups of the automorphism group of a regular tree.

The main goal of this thesis is to generalize the concept of universal groups to the broader class of right-angled buildings. In the locally finite case, these groups, equipped with the permutation topology, are examples of totally disconnected and locally compact groups.

After completely describing the open subgroups of the full automorphism group of a right-angled building, we define the universal group for a semi-regular right-angled building with local actions prescribed by a set of finite transitive permutation groups. We prove the (abstract) simplicity of these groups and, in the locally finite case, we describe their maximal compact open subgroups as intersections of iterated wreath products in imprimitive action and as generalized wreath products.

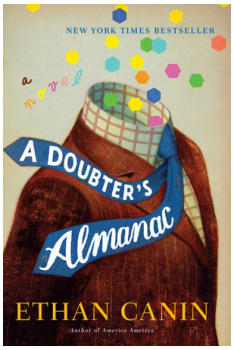
Then we transfer the idea of prescribing a local action to the universe of polygonal complexes. We define the universal group for CAT(0)-polygonal complexes whose links of vertices are all isomorphic to the Petersen graph. We prove some local-to-global results for these groups, indicating that it makes sense to apply the ideas of Burger and Mozes to geometric objects where we do not have such a nice geometry coming from the building, nor the combinatorial properties of the associated Coxeter group, but where we still get examples of totally disconnected and locally compact groups.

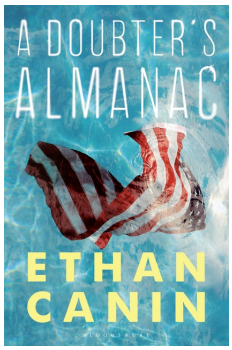
4 History, maths and art, fiction, jokes, quotations ...

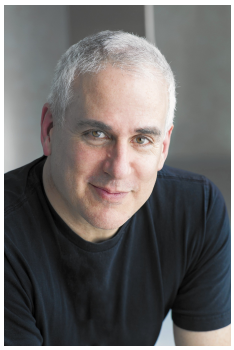
4.1 Adhemar's corner

And as usual, but always to be read with great pleasure, here are two reviews from Adhemar Bultheel.

A Doubter's Almanac, *Ethan Canin*, Penguin/Random House, (2016) ISBN 978-1-4000-6826-5 (hbk) 576 p., 28 USD and Bloomsbury Publishing (2016), 978-1-4088-7964-1 (hbk) 576 p., £18.99.



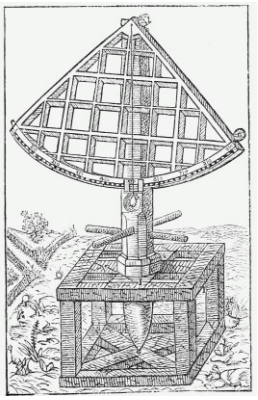




Ethan Canin 2016

This is a dramatic novel about love, tormented minds, inability to communicate, and addiction to alcohol, drugs, and –this is the reason why it is reviewed here– mathematics spanning three generations cursed by the gift of mathematics.

The main character Milo Andret grew up in the 1950's in Michigan's countryside. Son of a taciturn ex-navy father who is always busy fixing the house and a mother who has a chemist degree, but who spends most of her time reading novels. Milo had a gift for orientation and could find his way home from anywhere. A loner, he wandered the woods and spent a long time carving a 25 feet-long chain from a beech tree whose links were Möbius rings. Being good in mathematics, he was accepted at the UC in Berkeley and although interested in number theory was pushed by his advisor Hans Borland to do topology. When he sees a book with Tycho Brahe's quadrant, an instrument that he used to make accurate observations of the planets (his successor Kepler used these to formulate his laws), he builds one of his own and starts measuring to eventually rederive the laws by himself.



Brahe's Augsburg quadrant

Then he hits upon the long standing (fictitious) Malosz conjecture about certain equations having solutions in complex projective spaces. He meets a brilliant grad math student Earl Biettermann and their common friend Cle (for Cleopatra) Wells who calls them Newton and Leibniz. She becomes Milo's girl friend and introduces him to drugs but finally she chooses for the more daring Earl. Milo never got over it and starts drinking, but nevertheless succeeds in beating his competitors, the Japanese Kabayashi and Timofeyev in Kiev, by solving the Malosz problem first, and therefore he gets a position at Princeton.

Milo is now with his 32 years an assistant professor and seems to spend quite some money on his lifestyle,...and his alcohol consumption. His Berkeley advisor warns him that he has about 10 more years to finish his life's work. So he embarks upon another famous (again fictitious) problem of Ulrich Abendroth 'which concerned a subset of Whitehead's CW-complexes that were infinite yet finite-dimensional'. The department chair Hay Knudson is supporting him, even though he can be very rude and insulting to people, he has this drinking problem, and his liberal sexual relationships and his scientific output stays below expectations. However, when Milo can solve a simulation problem for the Pentagon, and he gets a research grant, he can convince Knudson to give him tenure track.

TI-120 computer

When he is informed that his Berkeley promotor died, he convinces Helena Pierce, the secretary of the department, to accompany him to the memorial service. There he meets Cle and Earl Biettermann who are then married for four years. Earl is making a lot of money with arbitrage transactions but in his free time is trying to disprove Milo's Malosz theorem. Milo humiliates Helena and at night, dead drunk, he makes a scene trying to get into her hotel room.

At some point he is informed that he has won the Fields Medal for solving Malosz. However his attempts to solve the Abendroth problem does not advance much. He is thunderstruck when he is presented a preprint of a paper by a 14 year old high school boy Seth Kopten who uses a computer to come much closer to the solution than he is with his analytic approach based on an old combinatorial topology paper by Erdős. He jumps like crazy on the computational track, acquiring an illegal prototype TI-120 computer and learning to program it in C++ with disks stolen from Knudson's office.

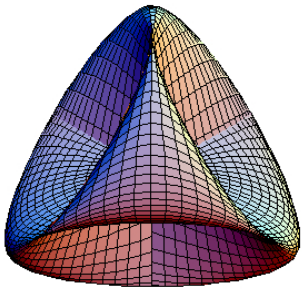
Milo succeeds in producing four papers on the base of his programs, but then Kopten drops the bomb by submitting a full proof following a completely different route, and making better use of the computer. Now Milo breaks down, neglects his teaching and when he is caught in bed with the wife of a colleague Nobel prize winner, it turns out to be the beginning of the end, even tough Knudson still wants to give him yet another chance, he is too egocentric and blurred by alcohol and tranquilizers and blows it.

This ends the first part. The second part is narrated by Hans, Milo's son. At that moment Milo is teaching in a school in the country. It turns out he married Helena and has two children, Paulette and Hans. He still pretends to do mathematics and keeps up his dressing standards while his wife is trying to survive financially, raising the children, arranging the whole household in function of her husband. He is still the grumpy brutalizing selfish drunk, adicted to Ativan. At some point, he takes the family on a trip to some remote shed in the woods nearby a pond. When asked why they are there, he announces he has bought the place to work there and expects the rest of the family to live with him. Both Hans and Paulette have the gift for mathematics. Milo however focusses on Hans while Paulette takes the side of her mother against her father.

The novel comes to a culmination when Hay Knudson comes visiting them, it is hoped that he will again offer Milo a job. After Knudson left, Milo says he came indeed for that reason, raising hopes in his wife that they will return again to civilisation in Princeton. However Milo says he declined because the offer was for algebraic topology ('just a bunch of equation hackers') and it was an assistent professorship, unworthy of a winner or the Fields Medal. It comes to a fight after which Helena and the children leave him.

Hans got a degree from MIT and becomes a financial wizard so he is hired by a company Physico. He is aplying the rules of financial mathematics, before the term even existed, and thus makes billions of dollars with arbitrage for the company and becomes stinkingly rich himself. He has a private driver and even a private jet. He marries Audra and has two children: Emmy and Niels, who again get the gift for mathematics. Especially Emmy. He however gets hooked on drugs: MDA and later MDMA (ecstacy). When his wife catches him with drugs in the house, he accepts to rehab and becomes clean, but looses his job, becoming, like his father a teacher in the country.

When he is informed that his father is not doing well, he drives over to help him. His wife and his mother initially do not want to have anything to do with it, but eventually they both give in and occasionally come over to help. When Milo is diagnosed with bone cancer, also Cle spends some time with them. Even her husband Earl, now in a wheelchair, joins them briefly. The latter has a row with Milo but leaves Hans a drug for 'when the pain gets unbearable'. Cle convinces Helena that it was always Helena that Milo has loved. When Niels and Emmy come over for a visit and meet their grandfather for the first time, everything seems ready for a happy-endig turning into a mellow tear-jerking tragedy and Milo finally dies in rather Shakespearean dramatic emotional circumstances. But his beloved ones remember some happy times from their childhood which is the happy-ending after all.

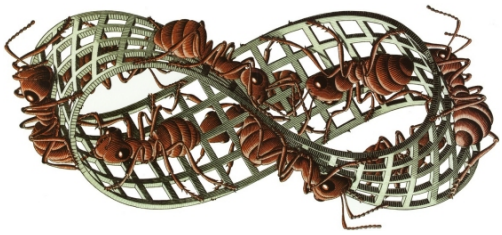


Steiner surface

What about the mathematics in this novel? I mentioned some of it already but the book is full of it. Here is some more. With his adviser in Berkeley, Milo discusses the Catalan-Mersene problem, and is advised to start reading about submanifolds of complex projective spaces. His competitor Kobayashi in the Malosz race follows the wrong approach based on the Hirzebruch-Riemann-Roch theorem. Milo found his solution by lifting the problem in a higher dimension. No further details given. It is obviously not trivial to discuss advanced mathematics in a literary novel. I do not exactly understand what purpose is served in the novel by letting Milo build the quadrant and derive Kepler's laws though (the laws do appear as mathematical formulas in the text). On his arrival at Princeton, Milo explains the basic principles of topology (this napkin ring and this coffee cup are topologically the same, and "to a topologist the rubber band is the primal object"), but Canin gives some more advanced description of topology as the discipline inspired by Poincaré's *Analysis Situs* paper. Topologists manipulate undrawable shapes in their minds, a world derived from principles not bounded by empiricism, something that Milo is very good at and he can draw rotations of a Steiner surface on a napkin for a colleague without a problem.

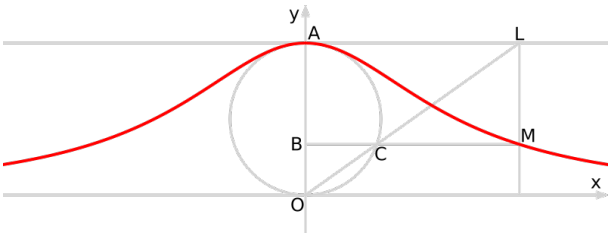
The whole book is built like a mathematical paper with parts that are named Induction, Deduction,

Contraposition, Restatement, Conjecture, Summation, Proof, Acknowlegments.
But many titles of chapters and sections are also references to something mathematical. Some examples:
You can't comb the hair on a coconut obviously refers to the hairy ball theorem.
Ant and rubber rope may remind us of a well known drawing by Escher of an ant on a Möbius band.
Flatland is the title of the book by E.A. Abbott.
The real are almost all irrational could also refer to the approximation or real numbers by rationals.



Thomson's lamp is a form of Zeno's paradox. A lamp is switched on and off at time intervals halving the previous one. Will it be on or off in the limit?
Drunkard's walk is a synonym of a random walk.
A topologist's apology is a parody on Hardy's book "A Mathematician's Apology".
The prisoner's dilemma is the well known logical puzzle.
Witch of Agnesi refers to the curve that is studied by Maria Gaetana Agnesi in the 18th century. She called it 'versiera' (from the Latin 'vertere' meaning turn) but the Italian 'avversiera' means female devil. The translation was wrong but the name stuck.
4656534 is a curious title and may refer to an even abundant number that is the product of 5 primes: $4656534 = 2 \times 3 \times 23 \times 41 \times 823$. There are indeed 5 mathematicians in the novel that do not communicate well with each other. However Wikipedia also refers to the first 4-6-5-6-5-3-4 triple play in a baseball game in the Major League history played by the Yankees on April 12, 2013, and the chapter has indeed many references to baseball.

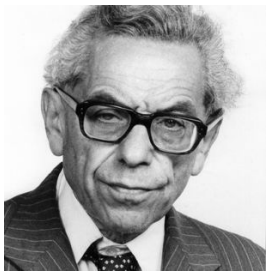
Maria Agnesi



the witch

Finally let me mention that names of the characters are chosen after mathematicians. Milo's son is called Hans Euler Andret. Hans refers to Milo's advisor in Berkeley, and Euler of course is the mathematician. Add to this his father and he is named after three mathematicians. Hans' sister Paulette is named after Paul Erdős and also the names of both of Hans' children refer to mathematicians. Emmy's full name is Emma Lovelace Andret named after two female mathematicians: Emmy Noether and Ada Lovelace while Niels refers to Niels Abel.

L. Euler



P. Erdős

N. Abel

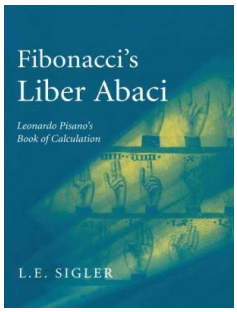
E. Noether

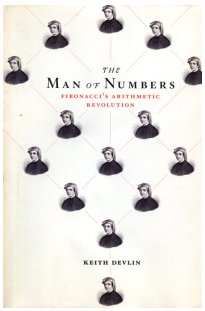
A. Lovelace

Canis started engineering studies, then did medicine but eventually made writing his main occupation. Of all the fiction novels written by or dealing with mathematicians that I know of, this one has the most references to mathematical items. Even the names of the mathematical journals that are mentioned are the appropriate ones. It may have helped that Canin had Jon Simon as a friend who is a topologist and professor emeritus at the University of Iowa. He has checked all the parephenalia. Concerning the fiction, that is another story. It is highly unlikely that the winner of a Fields Medal would not know how to proceed after solving an important mathematical problem. It is even more unlikely that a 14-year old would solve a famous open mathematical problem. Equally doubtful is that in modern times the head of the department has to hand over the preprint before Milo even knew about its existence. But Canin is undoubtedly a novelist with an exceptional craftsmanship. The orotund darkness of the characters and their addictions and the maudlin ending is what you would expect in any successful Hollywood movie.

Adhemar Bultheel

Fibonacci's Liber Abaci, Laurence Sigler, Sources and studies in the history of mathematical and physical sciences, Springer Verlag, (2002), ISBN:978-0-387-40737-1 (hbk). viii+633 p.
The man of numbers: Fibonacci's arithmetic revolution, *Keith Devlin*, Walker Books/Bloomsburry, (2011) ISBN 978-14088 2248 7 (hbk), 192 p.
Finding Fibonacci: The quest to rediscover the forgotten mathematical genius who changed the world, *Keith Devlin*, Princeton University Press, (2017) ISBN 978-06911 7486 0 (hbk), 256 p.






Keith Devlin

Ask random persons in the street if they know Fibonacci and there is a reasonable chance that they do. 'Didn't he have something about rabbits?' they may add. Some may know the Fibonacci numbers and their relation with the golden section. But much of the folk knowledge about Fibonacci is fake. Alternative facts so to speak.

To begin with his name. The man who lived from about 1170 till about 1250. Not much is known about him but according to the customs of those days, his name should be Leonardo Pisano (Leonard of Pisa), since we know that his home town was Pisa, where his father Guilielmo Bonacci was a well to do merchant. Fibonacci is a nickname invented by historian Guillaume Libri in 1838. It was inspired because in his (by now) most famous work *Liber abbaci*[1] (1202) he announced himself as *filius Bonacci* although his father's name was not Bonaccio. So instead of "son" he meant to say "of the Bonacci family".

His book *Liber abbaci* is a thick book of some 800 pages written in Latin, in which Fibonacci explains the Hindu-Arabic place-value numeral system with the nine digits and the zero. That system was already known a millennium earlier by the Indians and was used by the Arabs. Fibonacci learned about it when he joined his father in Bugia (currently known as Béjaïa in Algeria). He recognized the benefits of this system over the then usual Roman numeral system that was then used in Europe which required the use of finger arithmetic or of an instrument (the abacus[2]) and usually an accountant to do all the computations for the conversion of the sizes, weights, and currency for trading and for the emerging banking system. His book explains the system, how to compute with it and for its larger part it consists of practical examples of conversion, of computing interest and profit. One of the many examples is the rabbit example which gives rise to the so called Fibonacci sequence 1, 1, 2, 3, 5, 8, 13, 21, 34,.... That example was also known for a long time by the Indians in connection with Sanskrit prosody. It was popularized by the number theorist Édouard Lucas in the 19th century who called them Fibonacci numbers.


A page of *Liber Abbaci* with the Fibonacci sequence in the right margin

The recurrence relation $F_{n+1} = F_n + F_{n-1}$ for the Fibonacci numbers easily leads to the limit

[1] Fibonacci used this spelling with double b, although abaci is more common.
[2] *Liber abbaci* means 'Book of calculation'. Thus it is not explaining how to use the abacus, but on the contrary it explains how one can do without.

$\lim_{n\to\infty} F_{n+1}/F_n = \varphi = 1.618033988\ldots$, which by many is believed to appear in nature in many instances from the human body to phyllotaxis to the shape of seashells and that it should be the divine ratio[3] to be used in art creations and architecture. This story is debunked on mathematical grounds in Devlin's book.

So what is then the truth known about Fibonacci? We actually do not know much about the person. We only know his books[4]. But Fibonacci had a very keen marketing or outreach strategy. His *Liber abbaci* had many practical examples, but it was written in Latin, the language of the academics and the learned, not the language of the merchants and the bankers. However there exists hundreds of copies of *libri abbaco* which are vernacular light-versions of the *Liber abbaci*, and there must have been lessons to instruct the new system to the practitioners, so when this is added to the advantage it did indeed offer over the Roman numeral system, it took only few decades to have the new system generally accepted.

Typus Arithmeticae, is a woodcut from the book *Margarita Philosophica*, by Gregor Reisch, Freiburg, 1503. Boethius (left using the Hindu-Arab system) and Pythagoras (right using the abacus).

Thus if Fibonacci is known for his sequence of Fibonacci numbers illustrating the fertility of imaginary rabbits, then it is for the wrong reason. He is the one who introduced the numeral system to the Western world which is now used all over the planet. It is the only language that is understood worldwide. This is the reason for the outspoken admiration that Devlin has for Fibonacci. In his 2017 book be keeps repeating the tremendous importance of the invention of the Hindu-Arabic numeral system and how Fibonacci's way of spreading the news among the people for whom this really mattered was more important that al-Khwārizmī's *al-Jabr*.

Devlin's book *The man of numbers* from 2011 is the result of his exploration after he realized that no proper biography of Fibonacci existed and so little of the man was known. He is a mathematician, but after discovering his talent for writing popular mathematics books he reoriented his career and is very active as a writer, a blogger and appears often on television. He feels somehow related to Fibonacci after he learned how Fibonacci contributed to popularize the Hindu-Arabic system.

In fact, this is one of the highlights in *The man of numbers*. Fibonacci was forgotten for a number of centuries. Luca Pacioli in his *Summa de arithmetica*, (1494) refers to Fibonacci, which triggered Pietro Cossali in his history of mathematics book (1797) to point to Fibonacci as the originator of our numeral system. It was however as recent as 2003 when the missing link between the *Liber abbaci* and the vernacular *libri abbaco* was found. Fibonacci had referred several times to a *Liber minoris guise* (a Liber abbaci-light so to speak) or a *Libro di merchaanti*, that he had written, but it had never been found. Rafaella Franci eventually could identify a book from 1290 in the *Biblioteca Riccardiana* in Florence written in Umbria vernacular that directly refers to Fibonacci. This proved that he was not only the inspirator, but also the instigator of the European arithmetic revolution both in content and in form.

Of course, Devlin also explains whatever little bit is known about Fibonacci's life and of the time he lived in. Actually Fibonacci wrote several books and became rather famous in his time. He became a guest of Emperor Frederick II and in 1240, the Republic of Pisa granted him a salary for his services. The latter declaration is the last known historical trace of the man. Furthermore Devlin discusses the competing numeral systems and the Arabic sources that must have influenced Fibonacci. Naturally the contents of the *Liber abbaci* is extensively discussed, which he studied from

[3] A term introduced by Luca Pacioli in 1509. The name golden ratio is from Martin Ohm in 1835. But the number was known since antiquity.

[4] Although no original manuscript is left. We only know his revised edition from 1228. The probably oldest copy still available is from around 1275.

the first English translation by L. Sigler that appeared in 2002. Of course the basic operations, first for integers, then for numbers with fractional part. He starts with multiplication (the operation for which the new system is much better than the Roman numerals) and only then addition, subtraction, and division. The treatment follows strict logical rules in the tradition of Euclid's *Elements*. He introduces also the methods, old ones from the Arabic algebraic literature and new ones of his own invention. Casting out nines, rule of three, method of false position, and of double false position or *elchataym*[5],...It is richly illustrated with fully elaborate examples, and several chapters are devoted to practical problems (price of a product, investment, profit, money change, and metal alloys. The trailing extensive chapters are about computation with square and cubic roots and the method of *almuchabala*[6].

Statue of Fibonacci by Giovanni Paganucci, completed in 1863, in the Camposanto di Pisa.

Devlin concludes his book with a discussion of Fibonacci's legacy and influence which should not be the Fibonacci sequence not the golden section and *The Fibonacci Quarterly* journal is interesting for the applications, but there are no deep mathematics involved.

Devlin's most recent book is about his personal 'adventures' during the-making-of *The man of numbers*. It summarizes what is already in that book, but it is told from the viewpoint of the author. Much depended on good luck, like how he became a math expositor, how he visited Italy at the correct time, meeting the right people, and Sigler's translation published.

His quest has some funny aspects because of language communication problems, and the laidback Italian culture. When he is looking for a statue of Leonardo of Pisa and asks the tourist information center, they insist that he probably means Leonardo da Vinci. He also tells the story of the publication of Sigler's book. In fact Laurence Sigler succumbed to cancer in 1997 when the translation was finished up to editorial details. His wife Judith decided to do that but then there was the publisher who abandoned the project. The disks lost, it required a hacker to recover most of the text, from the computer but the typesetting was lost. When Springer was interested to publish the text they required a LaTeX version, which Judith had to learn, but finally against all odds, the book was published in 2002, exactly 800 year after Fibonacci had finished his original.

Devlin also describes his emotions when he is holding these old manuscripts that he, after some trouble, could finally leaf through, and there are two chapters of what came after the publication of *The man of numbers*. He draws a parallel between Fibonacci causing the arithmetic revolution and Steve Jobs who changed the way people thought about and handled computers with WIMPS[7]. In fact you can find a slide show called *Leo & Steve* about this on vimeo: vimeo.com/93390473 (Part 1) and vimeo.com/93532834 (Part 2) and another show with many pictures related to the *Man of Numbers* on www.maa.org/external_archive/devlin/Fibonacci.pdf. The last chapter is about a publication by William Goetzmann in which it is explained that Fibonacci describes in his *Liber abbaci* the basics of present-value analysis[8] and thus may be called the originator of modern finance.

Adhemar Bultheel

[5] This is equivalent to linear interpolation.

[6] This is the algebraic method of the *al-jabr* spelled out as *Al-kitāb al-mukhtaṣar fī ḥisāb al-ğabr wa'l-muqābala* which is *The compendious book on calculation by completion and balancing* in which a problem is solved by performing operations on an equation but keeping the 'balance' between the two sides.

[7] Windows, Icons, Menus, Pointers.

[8] This is a method for comparing the relative economic value of differing payment streams, taking into account the changing value of money over time. The present value of a euro is less than its future value because of its investment and interest potential.

Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten
The Royal Flemish Academy of Belgium for Science and The Arts

Academy Contact Forum
"Coding Theory and Cryptography VII"
Friday, October 6, 2017, Brussels, Belgium

The contact forum is organized by The Royal Flemish Academy of Belgium for Science and The Arts, and the research groups Incidence Geometry (Ghent University), COSIC (KU LEUVEN), and DIMA (VUB).

It will be held in Brussels at the Paleis der Academiën, Hertogsstraat 1, B-1000 Brussel.

List of invited speakers:

- Carl Bootland (KU LEUVEN, Belgium)
- Jan De Beule (VUB, Belgium)
- Sascha Kurz (University of Bayreuth, Germany)
- Keith Martin (Royal Holloway College London, United Kingdom)
- Thomas Peters (UCL, Belgium)
- Peter Vandendriessche (Ghent University, Belgium)

There is no registration fee. Please register by sending an e-mail to **leo.storme@ugent.be** with your name and affiliation. All information will be made available on `http://cage.ugent.be/~ls/website2017/contactforum2017.html`

The organizers:

A. Dooms (VUB)
S. Nikova (KU LEUVEN)
B. Preneel (KU LEUVEN)
V. Rijmen (KU LEUVEN)
L. Storme (Ghent University)

This contact forum is sponsored by: The Royal Flemish Academy of Belgium for Science and The Arts, research groups Incidence Geometry (Ghent University), COSIC (KU LEUVEN), DIMA (VUB), BCRYPT: Belgian Fundamental Research on Cryptology and Information Security, and the Scientific Research Networks "Veilige ICT" en "Codeertheorie en Cryptografie".

Faculty honorary doctorate Cédric Villani

10 October 2017

Professor Luc Sels, Rector of the KU Leuven, Professor Phillipe Muchez, Dean of the Faculty of Science, and Professor Peter Lievens, Vice Rector for International Policy and Alumni Policy and Honorary Dean of the Faculty of Science, cordially invite you and your partner to the conferral of a faculty honorary doctorate on Professor Cédric Villani, professor at the Université de Lyon, member of the French Parliament and president of the OPECST (Office parlementaire d'évaluation des choix scientifiques et technologiques).

Professor Villani is an award winning researcher whose work highlights the importance of the interaction between different fundamental scientific disciplines. His work focusses on the equations describing the behaviour of gases, fluids and plasmas, such as the Boltzmann equations. Villani's results are applied in the study of many different physical systems, in fluid dynamics, statistical mechanics and thermodynamics. He was awarded the Fields Medal for his work on the non-linear Landau damping in plasmas. Apart from his scientific research, he is committed to communicate mathematics and science to the broad public. He gave more than a hundred talks to a variety of audiences, from infants to academics, from TEDx to National Geographic. He authored several popular scientific books and columns, he is a welcome guest in television shows and worked on several movies. In France, he is known as "la rock star des mathématiques".

Professor Stefaan Vaes, Department of Mathematics, is the promoter of this faculty honorary doctorate.

The event takes place on Tuesday 10 October 2017 at 17h30 at the Promotiezaal of the University Halls (Naamsestraat 22, 3000 Leuven). You are kindly invited to a reception after the ceremony.

Before the academic ceremony, professor Villani will give a public lecture between 14h00 and 15h00 at auditorium Pieter De Somer (Charles Deberiotstraat 24, 3000 Leuven). You are cordially invited to join this lecture as well.

Programme

- Musical introduction
- Welcome by the dean of the Faculty of Science
- Laudatio by Professor Stefaan Vaes
- Awarding of the faculty honorary doctorate by Professor Luc Sels, Rector KU Leuven
- Musical interlude
- Epilogue by the faculty honorary Doctor Professor Cédric Villani

Registration for the honorary doctorate:

https://wet.kuleuven.be/advancedcuriosity/az-cedric-villani/registration-faculty-honorary-doctorate

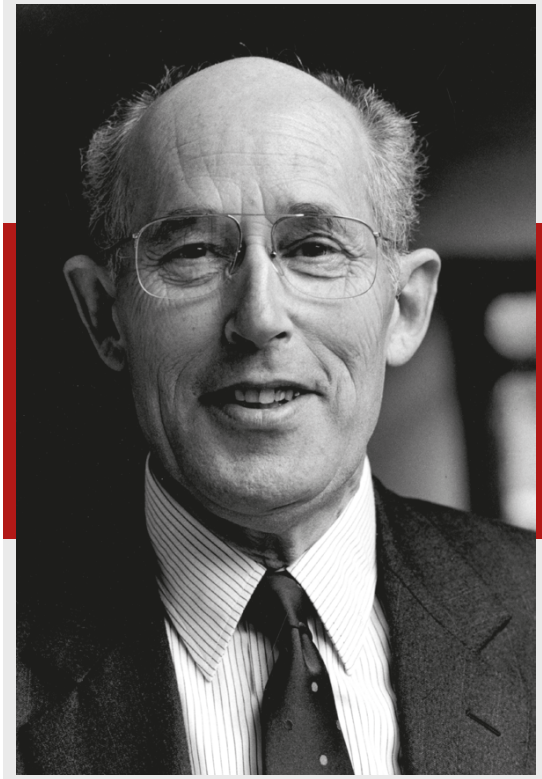
Registration for the public lecture:

https://wet.kuleuven.be/advancedcuriosity/az-cedric-villani/registration-public-lecture

More information about the programme:

http://advancedcuriosity.be

Riemannian Geometry
Past, Present and Future:
an homage to Marcel Berger



6-9 December 2017

Marilyn and James Simons Conference Centre

IHES - Bures-sur-Yvette

Speakers:

Simon BRENDLE *(Columbia University)*
Robert BRYANT *(Duke University)*
Yaiza CANZANI GARCIA *(University of North Carolina)*
Gilles CARRON *(Université de Nantes)*
Jeff CHEEGER *(Courant Institute of Mathematical Sciences)*
Tobias COLDING *(MIT)*
Mikhail GROMOV* *(IHES)*
Karsten GROVE *(Notre-Dame University)*
Colin GUILLARMOU *(CNRS and Université Paris-Sud)*
Ursula HAMENSTÄDT *(Rheinische Friedrich-Wilhelms-Universität Bonn)*
Dominique HULIN *(Université Paris-Sud)*
Bruce KLEINER *(Courant Institute of Mathematical Sciences)*
Blaine LAWSON *(Stony Brook University)*
André NEVES *(University of Chicago)*
Dorothee SCHÜTH *(Humboldt-Universität zu Berlin)*
Robert YOUNG *(Courant Institute of Mathematical Sciences)*

* to be confirmed

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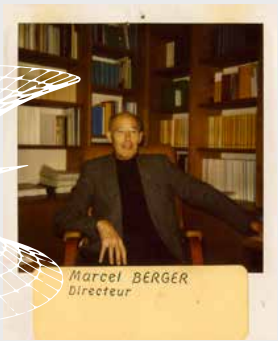

Information & registration:
www.ihes.fr

Cycle de conférences ALTAÏR

Programme 2017-2018

Le Centre d' Histoire des Sciences et des Techniques de l'ULB propose

7 octobre 2017 : Jean-Louis Migeot (ULB / Conservatoire de musique de Liège) « Des chiffres et des notes: les harmonieux rapports des mathématiques et de la musique »

14 octobre 2017 : Filippo Gazzola (Politecnico di Milano) « Peut-on avoir confiance en les ponts suspendus ? »

2 décembre 2017 : Emmanuël Jehin (ULg) : « TRAPPIST-2 et SPECULOOS , à la recherche des mondes habitables »

16 décembre 2017 : Benoît Famaey (ULB): « Matière Noire: CERN, ne vois-tu rien venir? »

24 février 2018 : Stéphane Detournay (ULB) "Ondes gravitationnelles: Einstein et la musique des trous noirs"

24 mars 2018 : Marianne Michel (UCL) « Aperçu des mathématiques de l'Égypte ancienne.
Fausses positions, racines carrées, aires de disques et inclinaisons. »

5 Mai 2018: Dimitri Pourbaix (ULB) « Le satellite Gaïa : Quand le ciel passe en haute définition. »

Horaire : le samedi matin de 10h à 12h
Localisation : ULB Campus Plaine, Forum Auditoire F, Boulevard du Triomphe
Tout public : 5 € par séance
Etudiants : entrée gratuite
Membres d'Altaïr (cotisation annuelle 12,50 €) : entrée gratuite

Renseignements : Alain Jorissen et Luc Lemaire

Alain.Jorissen@ulb.ac.be,llemaire@ulb.ac.be