BELGIAN MATHEMATICAL SOCIETY

Comité National de Mathématique CNM

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NCW Nationaal Comite voor Wiskunde

BMS-NCM NEWS: the Newsletter of the Belgian Mathematical Society and the National Committee for Mathematics

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BMS-NCM NEWS

No 82, March 15, 2011

Letter from the editor

Hello everybody!!
Welcome to this spring issue of our Newsletter

Françoise

Contents

1 News from the BMS

Happy birthday !!

In a document recently prepared for the EMS, Luc Lemaire wrote : *The early history of the Belgian Mathematical Society is documented through two thick notebooks, handwritten between 1921 and 1946 as minutes of the meetings of the Society [. . .] The first page is dated March 14, 1921, and presents the decision to create a "Mathematical Circle where all questions concerning pure and applied mathematics would be considered, by lectures, communications and discussions" [. . .]*

So, BMS (including Circle) is 90 years old. . .

Here is the full list of the Presidents . . . Many thanks to Paul Van Praag and Franz Bingen who carried out a considerable job to make it complete!

The Mathematical Circle: from14-03-21 to14-01-22: De Donder.
And then the BMS:

1. from 14-01-22 to 20-10-23: De Donder
2. 23-25: Bosmans
3. 25-27: Demoulin
4. 27-29: de La Vallée Poussin
5. 29-31: Mineur
6. 31-33: Godeaux
7. 33-35: Errera
8. 35-37: Merlin
9. 37-39: Fernand Simonart
10. 39-45: Bony

11. 45-47: Germay
12. 47-49: Mr le Chanoine Lemaître
13. 49-51: Th Lepage
14. 51-53: Fernand Backes
15. 53-55: Octave Rozet
16. 55-57: Louis Bouckaert
17. 57-59: Paul Libois
18. 59-61: Julien Bilo
19. 61-63: H. Garnir
20. 64-65: Robert Ballieu
21. 66-67: E. Francks (ERM)
22. 68-69: Pol Burniat
23. 70-71: C.C. Grosjean
24. 72-73: R. Lavendhomme
25. 74-75: H. Breny
26. 76-77: A. Warrinier
27. 78-79: R. Debever
28. 80-81: Franz Bingen
29. 82-83: José Paris[1]
30. oct 1983-oct 1986: Richard Delanghe
31. oct 1986-oct 1988: Paul van Praag
32. oct 1988-oct 1992: Alain Verschoren
33. oct 1992-oct 1993: "daily business" (lopende zaken, affaires courantes)
34. oct 1993-oct 1996: Luc Lemaire
35. oct 1996-oct 1999: Freddy Dumortier
36. oct 1999-oct 2002: Jean Schmets
37. oct 2002- oct 2005: Adhemar Bultheel
38. oct 2005-oct 2008: Catherine Finet
39. oct 2008-oct 2011: Stefaan Caenepeel

[1] then a decision was made to reorganize elections

2 Meetings, Conferences, Lectures

2.1 March 2011

Mons, 15 mars 2011

Les services *d'Analyse Mathématique et de Probabilités et Statistique de l'Université de Mons* organisent une journée de rencontres et d'exposés dans le cadre de l'EDT Mathématique-FNRS, **le 15 mars 2011**. Le conférencier est **Bernard Beauzamy,** Président de la Société de Calcul Mathématique (Paris). Les thèmes de ses exposés sont

- 10h30: *Peut-on être mathématicien dans le secteur privé?*
- 14h30: *Description des activités de la Société de Calcul Mathématique*

La réunion aura lieu au bâtiment "le Pentagone" (local 0A11), avenue du champ de Mars, Mons.

Informations et contact: catherine.finet@umons.ac.be

L'enseignement des mathématiques, des mathématiques du quotidien à la théorie
Colloque international du 16 au 19 mars, Mons et Lille

en l'honneur de Nicolas Rouche

La journée du 16 mars se tiendra à Mons (Belgique) et est reconnue comme "journée de formation par l'IFC" pour les enseignants de mathématiques et les instituteurs.

Inscription et programme sur http://irem.univ-lille1.fr/ja/ Si vous demandez la reconnaissance de votre participation à la journée du 16 mars en tant que formation IFC, veuillez également vous inscrire sur le site de l'IFC, voir le lien "inscription" sur le site http://irem.univ-lille1.fr/ja/

Le programme complet ainsi que toutes les informations concernant le colloque sont disponibles via le site web du congrès :

http://irem.univ-lille1.fr/ja/programme.php?par=programme

Le colloque est accessible aux enseignants de mathématique, tous niveaux, aux instituteurs et à toute personne intéressée par l'enseignement des mathématiques.

Nous ne pouvons pas garantir l'inscription au repas à Mons pour les inscriptions enregistrées après le 2 mars. Le repas sera gratuit pour les doctorants inscrits dans une université belge,et bien entendu pour les inscrits via l'IFC.

Pour toute information complémentaire, veuillez contacter les organisateurs : monslille2011@gmail.com et spécifiquement pour la journée à Mons : christian.michaux@umons.ac.be

2.2 January-June 2011

Doctoral course:
6 lectures in multicriteria decision aid and multi-objective optimization.

Organizers: Y. De Smet (ULB), Th. Marchant (UGent), M. Pirlot (UMONS)
Target audience: doctoral students in decision, optimization, operational research, preferences in data base search
Goal: offer an introduction (at doctoral level) to a few fundamental mathematical models in the field of multiple criteria decision analysis and multi-objective optimization and to algorithmic problems raised by the use of such models.

Organization: six lectures of about 3 hours in English (once a month from January to June). Each lecture focuses on a specific topic. All lectures will take place in Brussels (ULB, Campus Plaine) or Mons (UMONS, Faculté Polytechnique) as indicated in the programme below.

Venue for the first lecture in Mons: UMONS, Faculté Polytechnique, rue de Houdain 9, 7000 Mons, Seminar room of MathRO (Mathematics and Operational Research department), third floor

All lectures in Mons will take place in the same room. The location of the lectures in Brussels will be announced later.

Further information: contact Prof. Marc Pirlot: marc.pirlot@umons.ac.be

Inscription is free; for organizational purposes it is asked that people intending to attend the lectures let it know to one of the organizers.

Programme

1. January 20, 2011 (Thursday), 14.00-17.00 in Mons. M. Pirlot (UMONS): Additive value functions and conjoint measurement
2. February 23, 2011 (Wednesday), 14.00-17.00 in Brussels. D. Bouyssou (CNRS Paris Dauphine): Models for deciding under risk and uncertainty
3. March 23, 2011 (Wednesday), 14.00-17.00 in Brussels. J. Figueira (Université de Nancy): Outranking methods
4. April 27, 2011 (Wednesday), 14.00-17.00 in Mons. P. Meyer (Telecom Bretagne): Algorithms and software for aiding decision : the Decision Deck project
5. May 18, 2011 (Wednesday), 14.00-17.00 in Brussels. To be confirmed, M. Geiger (Universität Hamburg): Interactive methods in multiple objective optimization
6. June 15, 2011 (Wednesday), 14.00-17.00 in Mons. P. Perny (Paris VI): Multiobjective combinatorial optimization

This programme could be modified. The persons who would like to be informed of possible changes in the programme are invited to contact the organizers.

This course is organized with the support of the thematic doctoral school in Mathematics (EDT Math, FNRS).

2.3 May 2011

The European Science Foundation (ESF) - in partnership with EMS and ERCOM/IML - is organising a conference on MEGA 2011:

Effective Methods in Algebraic Geometry
May 2011, Sweden.

See http://www.esf.org/conferences/11372

This conference will be chaired by Prof. Sandra di Rocco, KTH Stockholm, SE and Mikael Passare, Stockholm University, SE.

Closing date for paper submissions is February 8, 2011. Closing date for applications is March 16, 2011.

This conference is part of the 2011 ESF Research Conferences Programme¡http://www.esf.org/conf2011¿ and is accessible online from www.esf.org/conferences/11372¡http://www.esf.org/conferences/11372¿.

Category Theory, Algebra and Geometry
May 26-27, 2011

The conference will be held on Thursday the 26th and Friday the 27th of May 2011 in Louvain-la-Neuve

Invited speakers

- Eugenia Cheng, University of Sheffield
- Maria Manuel Clementino, Universidade de Coimbra
- René Guitart, Université Paris 7 Denis Diderot
- Kathryn Hess Bellwald, Ecole Polytechnique Fédérale de Lausanne
- Peter Johnstone, University of Cambridge
- André Joyal, Université du Québec à Montréal

- Tom Leinster, University of Glasgow
- Sandra Mantovani, Università degli Studi di Milano
- Ieke Moerdijk, Universiteit Utrecht
- Ross Street, Macquarie University
- Isar Stubbe, Université du Littoral-Côte d'Opale

Informations: http://perso.uclouvain.be/tim.vanderlinden/ctag.html

Chaire de la Vallée Poussin, 24-27 mai 2011
Monoidal categories in, and linking, geometry and algebra

Le Professeur **Ross STREET** (Macquarie University, New South Wales, Australie) fera une série d'exposés dans le cadre de la Chaire de la Vallée Poussin 2011 du 24 au 27 mai 2011.

Toutes les leçons seront données en l'auditoire de la Vallée Poussin (CYCL 01) du bâtiment Marc de Hemptinne, chemin du cyclotron, 2 à Louvain-la-Neuve.

Programme:

- Mardi 24 mai : 16h-17h - Leçon inaugurale: *From linear algebra to knot theory via categories*
- Mercredi 25 mai : 16h-17h: *Monoidal categories, Hall algebras and representation theory*
- Jeudi 26 mai : 16h-17h : *Mackey functors and classifying spaces*
- Vendredi 27 mai : 9h-10h: *Monoidal category theory for manifold invariants*

FNRS group "Functional Analysis"
May 31, June 1, 2011
Esneux (Liège) , Domaine du Rond-Chêne

Following the tradition, the FNRS group "Functional Analysis" will meet next May (Tuesday May 31, Wednesday June 1, 2011). The meeting will take place in the small town of Esneux, in the "Domaine du Rond-Chêne"

The following speakers have already confirmed their participation (alphabetical order):

- Bruno BRIVE, U. Mons
- Bernardo CASCALES, U. Murcia
- Bernard DIEROLF, U. Trier
- Jörg ESCHMEIER, U. Sarrebrücken
- Maria JOSE BELTRAN, U. Pol. Valencia

Contacts: Françoise Bastin (F.Bastin@ulg.ac.be) or Samuel Nicolay (S.Nicolay@ulg.ac.be)

2.4 June 2011

Numeration
Liège, June 6-10, 2011

The goal of this conference is to bring together researchers interested in numeration systems from various points of view. This includes geometric aspects (fractals, tilings, quasi-crystals), dynamical/probabilistic aspects (odometers, subshifts), analytic aspects (related arithmetical functions), topological aspects (compactifications and applications), and computer science (automata, languages).

Topics of the Conference

- General numeration systems,
- Geometric representations, Rauzy fractals, tilings
- Representations of operations in Pisot base by finite automata,
- Sofic systems associated with Pisot numbers,
- Redundant representations and cryptography,
- Shift-radix systems,
- Abstract numeration systems,
- Negative base systems,
- beta-integers,
- Delaunay (Delone) sets,
- Dynamical systems and cocycles related to numeration,
- Spectra and spectral measures associated with numeration,
- Sums of digits for classical and non-classical numerations, associated fractals,
- S-adic conjecture,
- Analytic and probabilistic study of arithmetic functions related to numeration,
- Cellular automata,
- Link with mathematical logic and definable sets of numbers

Invited Speakers (Instructional lectures)

- Bernard Boigelot, University of Liège
- Yann Bugeaud, Université de Strasbourg
- Cor Kraaikamp, TU Delft
- Jörg Thuswaldner, University of Leoben

an extra talk on Cobham's theorem for substitutions given by Fabien Durand, LAMFA, Amiens

Scientific Committee

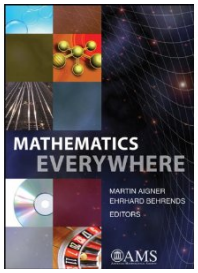
- B. Adamczewski, CNRS, Univ. Claude Bernard Lyon 1
- V. Berthé, CNRS, LIAFA
- C. Frougny, LIAFA, CNRS & Univ. Paris 8
- P. Grabner, TU Graz
- P. Liardet, Université de Provence
- E. Pelantová, Czech Technical University, Prague
- M. Rigo, ULg
- J. Shallit, Univ. of Waterloo
- W. Steiner, CNRS, LIAFA

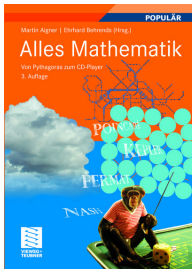
See also the page http://www.cant.ulg.ac.be/num2011/

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

Mathematics Everywhere *Martin Aigner and Ehrhard Behrends (eds.)*, AMS, 2010 (xiv+330 p.), soft cover, ISBN 978-0-8218-4349-9.


M. Aigner






E. Behrends

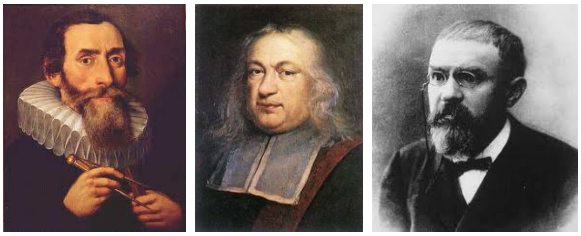
The Urania Society in Berlin has a history that goes back to Alexander von Humboldt who gave in 1827/1828 public "cosmos lectures" intended for a general public. Urania became a formal society in 1888 with in its statutes the paradigm of "Spreading the knowledge, achievements, and joy of (the 'new') Sciences". Today it has over 2000 members and is one of the oldest and largest non-profit societies residing in Berlin.

Urania, Berlin

Besides a successful film-festival, and many other activities, one of its initiatives is, as it was at the start, still to organize generally understandable lectures concerning current questions of nature and *Geisteswissenschaften*. By 1990, the lectures treated all kind of subjects but "there wasn't a single one dealing with mathematics". The classical false premises were used: that mathematics are "too abstract, too dry, and too hard" for the layman. In a world where "mathematics are everywhere", it was decided that this should change. By 2000 some fifty lectures had been discussing mathematical topics, and although they were about mathematics (and that includes also the equations and formulas!) they were presented in a lively way, explaining sometimes difficult mathematical topics using a step by step approach and illustrating them in an environment of every-day life or presenting them in a story-telling format or a gaming situation. The original German version of this book was entitled *Alles Mathematik* and appeared in 2000 (*Vieweg*). It contained a selection of elaborated texts of some of the lectures that were given in the Urania initiative. In subsequent second (2002) and third (2008) German editions new lectures were added.

This English translation contains 21 chapters, each one written by well known researchers. They are organized in three groups: 'Case Studies', 'Current Topics', and 'The Central Theme'. There is a 'Prologue' by a science journalist (G. von Randow) and and 'Epilogue' by a mathematician-philosopher (Ph. J. Davis).

The prologue has an author that is obviously convinced of the 'joy of mathematics", and that mathematics gains a booming popularity in party-conversations. It is the reviewer's experience that this is still the privilege of a happy-few enthusiasts, and that in most cases it is still a no-go zone if you want to socialize with non-mathematicians.


Kepler, Fermat, Poincaré

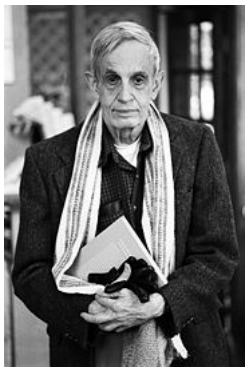
The epilogue is an interesting read. It gives excerpts of a lecture given in 1998 at the International Mathematical Congress in Berlin and discusses "The prospects for mathematics in a multi-media civilization" but the message is broader than just the multi-media aspects. Twelve years later, it is quite interesting to (re-)read it and see how much of the content has been realized and how much has faded away.

The other chapters, being written by different authors, have different styles and lengths and they also differ in the amount of the mathematical details. In the group of "case studies" we find some topics that are somewhat predictable like the encoding of CD's, different aspects of image processing in medical applications, shortest path and other graph theoretical problems and their applications. But there are also some chapters that I didn't encounter before as being popularizing math topics

like Turing instability and spontaneous pattern forming phenomena in nonlinear dynamical systems. The nice thing about this chapter is that the reader is brought a long way by an analogy with the love-life of Romeo and Juliet and their twin-siblings Roberto and Julietta. Similarly computer tomography is introduced using the game of battleship (where one has to find out blindly where the opponent has placed his battleships on a grid) while the chapter eventually becomes involved in nanotechnology. The chapter about "intelligent materials" stays at the surface of mathematics, and so does the chapter on reflections of hinged mirrors, spherical mirrors and hyperbolic geometry, but the latter of course can be very nicely illustrated. Being the written summary of lively presentations, it is clear that all chapters have ample occasion of visualizing illustrations.

Fisher Black, Myron Scholes

The group of chapters on "current topics" aren't too much different. There is one on the role of mathematics in the financial markets, and this isn't inspired by the recent global crisis, but treats things such as the role of stochastics, arbitrage, and the Black-Scholes formula. The next chapter deals with electronic money. After all coins and bank notes are just symbols, that do not have a value as such. Similarly electronic money is just a string of bits. So the problem is to distinguish between strings that are just information and others that have economic value just like money, which brings the reader to the subject of cryptography. The huge computational challenge lying in the simulation of the global dynamical system that leads to climate change is another such topic that fits into a decor of a changing world leading to catastrophic effects in an ever faster succession. Another chapter is about sphere packing, which is of a more entertaining subject, but yet has lead to a new and deep mathematical machinery in a sequence of efforts to solve Kepler's conjecture. If spheres are packed like we see then piled up on display at fruit markets, then the density of the space covered by the spheres is $\pi/\sqrt{18}$. Kepler conjectured that one can not do better. The chapter is dealing with the history of this conjecture and even formulates theorems and uses formulas. It brings us up to the computer proof of Hales in 1998. Other mathematical problems with a long history are dealt with in a chapter on Fermat's last theorem and one about the Nash equilibrium. The remaining chapter in this group is a short one on quantum computing.



John Forbes Nash

The latter ties up with the first of the next five chapters that are classified in the group "central theme". It explains how huge prime numbers, or rather the factorization of huge numbers into its prime factors, forms the heart of our current cryptosystems, but if ever we succeed in getting a quantum computer to work, then we break down the bounding walls of current computability and hence another basis for cryptography will have to be invented. The next two chapters, although they have serous applications and involve some good mathematics, will probably be perceived by a broader audience as being related to mathematical recreation. The first gives some insight into knot theory. This is often what is needed to design or solve some three-dimensional puzzles. Also the other chapter on the geometry and physics of soap bubbles is a fun-subject for many. Not so remote from these subjects is the much more fundamental subject of the structure of space and the Poincaré conjecture (every closed simply connected three-dimensional space is topologically equivalent to a three-dimensional sphere). More generally it gives the complete classification of *all* three-dimensional spaces as elaborated by Thurston, Hamilton and Perelman, and this depends on the theory of heat diffusion. This is a relatively long chapter which dives a bit deeper into the mathematics. The final chapter in this group is about the roots and applications of probability, which entered mathematics at a rather late stage of its evolution.

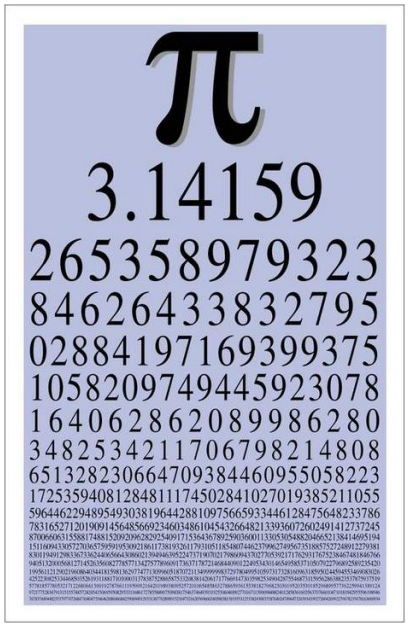
sphere packing, soap bubbles

Adhemar Bultheel

New pi-trivia

Did you know ...

- ... that today is π-day? Why? Because in America they write 3/14 for the date of today March 14, and 3.14 is an approximation to the number π.
- ... that on August 3, 2010 a new world record in the computation of digits of π was set by the Japanese engineer Shigeru Kondo?
  A total of 5 000 000 000 000 decimal digits were computed (on a homemade computer with 32 TB disk space). Kondo will now try to calculate twice as much digits. Yukiko, his wife, isn't very happy with it, since their electricity bill is now sky high.



- ... that Nicholas Sze, a researcher working for Yahoo, has broken another π-record in September 2010? He managed to calculate the 2 000 000 000 000 000th binary digit, and it is a zero. A cluster of thousand computers executed this complex calculation. It took them 23 days. Note that the probability to get this right by guessing is one half.
  For your information, the first binary digits of π are:

```
11.
 00100100 00111111 01101010 10001000
 10000101 10100011 00001000 11010011
 00010011 00011001 10001010 00101110
 00000011 01110000 01110011 01000100
 10100100 00001001 00111000 00100010
 00101001 10011111 00110001 11010000
 00001000 00101110 11111010 10011000
 11101100 01001110 01101100 10001001
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- ... that the number π can really be found in nature? You can see a proof on this picture (taken by the author), a special type of Early spider orchid (Ophrys Sphegodes) for wich the name Early sπder orchid seems more appropriate.

- ... that in 1811 the mathematician Pierre Simon de Laplace proved the following beautiful formula that relates the numbers π and e?

$$\int_{-\infty}^{+\infty} \frac{\cos x}{x^2+1}\,\mathrm{d}x = \frac{\pi}{\mathrm{e}}$$

- ... that even in the year 2010 new formulas featuring the number π were found? Here is one of them:

$$\pi^3 = \frac{216}{7}\sum_{n=0}^{\infty}\frac{\binom{2n}{n}}{16^n(2n+1)^3}$$

  (Pilehrood & Pilehrood).
- ... that since the beginning of the previous century there are people who try to compose sentences in which the lengths of the consecutive words are precisely the decimal digits

of the number π? The most famous example is probably:

How I need a drink, alcoholic in nature, after the heavy lectures involving quantum mechanics!

One of the problems that arises is of course the following: what with the 0? Well, a zero corresponds to a word of 10 letters. A number of consecutive very small decimal digits constitutes another problem. In this case we 'rearrange' them: if we have for instance 1211 we can read this as 12 followed by 11, hence we use a 12-letter word followed by an 11-letter word. Using these rules and some others we can now start writing a book based on the digits of π. This is exactly what Mike Keith has done, in *Not A Wake: A Dream Embodying π's Digits Fully For 10000 Decimals.*

The book consists of 10 sections each of which corresponds to 1000 decimal digits of π.

This is how it starts:

> *Now I fall, a tired suburbian in liquid*
> *under the trees*
> *Drifting alongside forests simmering*
> *red in the twilight over Europe.*

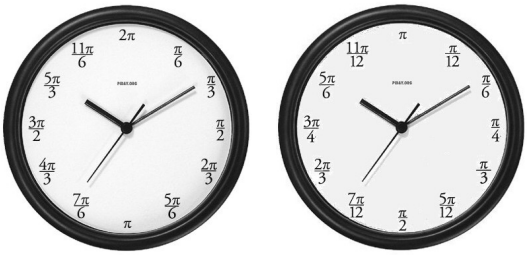
Note that the title of the book also follows the rules...

- ... that the number π can be found on the grave of the mathematician Ferdinand von Lindemann?

This is a detail of the tomb:

The number π is surrounded by a circle and square that are intertwined. Von Lindemann was the first to prove that π is a transcendental number: it does not satisfy an algebraic equation with rational coefficients. An immediate consequence of this result is the impossibility of *squaring the circle* (constructing a square with the same area as a given circle by using only a finite number of steps with compass and straightedge).

- ... that there are some scientists who think that π is wrong? What they mean is that the value defined by π is the wrong one. It would have been better to define π as being equal to 6.2831 (double of what it is now). This choice would certainly have made it easier to read the time on the π-clock: on the left you see the real clock, on the right what it would look like if $\pi = 6.2831$.



- ... that we now know why the name pi(e) was given to this constant?

3.14

PI.E

- ... that we now understand where the pi in 'piano' comes from?

Note. Here's another one that has not been retained for the definite list of π-trivia this year:

$$\ln 2 = \frac{2}{1+\sqrt{2}} \cdot \frac{2}{1+\sqrt{\sqrt{2}}} \cdot \frac{2}{1+\sqrt{\sqrt{\sqrt{2}}}} \cdots$$

This result is related to π in the following way: the proof is exactly the same as the one for Viete's formula for π, but the hyperbolic functions are used instead of the trigonometric ones.

(*Paul Levrie 2011*)

UMONS
Université de Mons

Faculté
des Sciences

Catherine FINET – Bruno BRIVE
Karl GROSSE-ERDMANN

Services d'Analyse mathématique et de Probabilités et Statistique

B. BEAUZAMY

Président de la Société de Calcul Mathématique - Paris

10h30 ***Peut-on être un mathématicien dans le secteur privé ?***

15h00 ***Description des activités de la société de calcul mathématique (www.scmsa.com)***

MARDI 15 MARS 2011
Le Pentagone – Salle 0A11
Avenue du Champ de Mars, 6
7000 Mons

Invitation cordiale à tous

Numeration 2011

Liège June 6-10

http://www.cant.ulg.ac.be/num2011/

Invited lecturers

B. Boigelot, Université de Liège
Y. Bugeaud, Université de Strasbourg
C. Kraaikamp, TU Delft
J. Thuswaldner, Montanuniversität Leoben

Scientific Committee

B. Adamczewski, V. Berthé, C. Frougny, P. Grabner,
P. Liardet, E. Pelantová, M. Rigo, J. Shallit, W. Steiner

April 30, 2011 : deadline for submitting an abstract
May 31, 2011 : deadline for registration