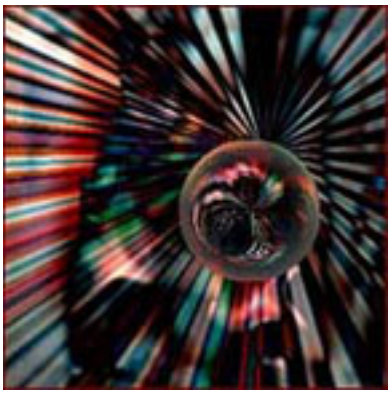
BELGIAN MATHEMATICAL SOCIETY

Comité National de Mathématique CNM

C W M
N

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

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No 44, September 15, 2003

1 News from the BMS

During the last meeting of the BMS Committee (May 17, 2003), the following items were discussed.

1. The BMS/NCM/SRN study day on Genomics (18/10/2003)

   This meeting will be held at Royal Academy on Saturday October 18 2003. Invited speakers are
   M. Gromov (IHES Bures sur Yvette) who declined and is replaced by A. Carbone (University of Paris 12/IHES Bures sur Yvette)
   David Balding (Imperial College, London) [accepted]
   David Rand (Un. of Warwick, UK) [accepted]
   Shoshana Wodak (ULB, BE) [accepted];

   More information can be found at the URL: http://www.cs.kuleuven.ac.be/~ade/WWW/WOG/genomics/ **and see also the leaflet at the end of the Newsletter.**

2. The BMS is considering participating in the following projects of the European 6th framework: CITIZEMS (A comprehensive Information system Through Integration of the Zentralblatt-MATH Europe-based database in the Mathematical Sciences); DML-EU (Digital Mathematical Library-Europe); INGADIM (A European Infrastructure for Information Gathering and Distribution in Mathematical Sciences).

3. Announcement of the Congresses of the BMS (in cooperation with NWG, SMF and Lux. Math.Soc.):
   (a) The Congress of 2004 will be a joint meeting of the Royal Dutch Mathematical Society and the BMS. There will be 3 main speakers; one from the Netherlands, one from Belgium, and one from elsewhere. The dates are set for April 16–17 2004 in Tilburg (NL).
   (b) The Congress of 2005 will be a joint venture of the BMS, SMF, NWG, and Lux. Math. Soc. The proposed days are: Friday May 20, Saturday May 21, and Sunday May 22 2005 in Gent (B). The meeting in Gent will include the tri-annual Brouwer memorial lecture. There will be 5 main speakers and about 10 (mathematical) sessions.

4. The new URL of the BMS is : http://bms.ulb.ac.be.

The next meeting of the Executive Committee is scheduled on September 27, 2003.

2 Meetings, seminars, conferences

2.1 October 2003

Machine learning in Bioinformatics
October 17, 2003, Brussel

The Computational Modeling lab (COMO) of the Vrije Universiteit Brussel (VUB) organizes the "Machine learning in Bioinformatics" conference. It is organized in the context of the FWO scientific network "Machine Learning for data mining and its applications".

A list of confirmed speakers is available at: http://homepages.vub.ac.be/ thamelry/mlb.html

Local organizing committee:
Thomas Hamelryck, Bernard Manderick, Ann Nowe
Computational Modeling Lab (COMO), Department of Computer Science (DINF)
Vrije Universiteit Brussel (VUB), Pleinlaan 2, B-1050 Brussel, Belgium

Study Day on Mathematics and Genomics
October 18, 2003
Paleis der Academiën, Hertogsstraat 1, 1000 Brussel

Organization: Belgian Mathematical Society, National Committee of Mathematics, Scientific Research Network Advanced Numerical Methods for Mathematical Modeling

See the pages `http://www.cs.kuleuven.ac.be/~ade/WWW/WOG/genomics/.` and **the leaflet at the end of this Newsletter.**

2.2 November 2003

Groups and Geometries: a tribute to Francis Buekenhout
Friday 21 and Saturday 22 November 2003
Université Libre de Bruxelles

The invited speakers are
Arjeh Cohen : Filtration in geometry
Dan Hughes : Fifty years of our mathematics
Antonio Pasini : Flag-transitive linear-dual linear geometries: a survey
Ernie Shult : The axiomatic nature of geometry: what Francis Buekenhout taught me
Jef Thas : Generalized polygons in finite projective spaces
Jacques Tits : Automorphism groups of unitals

More details, including the schedule of the lectures, is available at the following WWW address: http://cso.ulb.ac.be/ dleemans/conf/

On the evening of Friday 21, there will be a conference dinner. The fee should be around 40 euros per person.

If you wish to participate to the conference, please send an email to Dimitri Leemans (dleemans@ulb.ac.be) before October 31st, 2003. In case you intend to come to the conference dinner, please inform us explicitly in your email.

Hoping to see you then,

The organizers,
J.-P. Doignon, J. Doyen, M. Dehon, D. Leemans, B. Mühlherr, J.-P. Tignol.

2.3 2003-2004

April 03-March 04

To have the list of the workshops to be held at *Research Institute for Mathematical Sciences Kyoto University* for the period April 2003, March 2004, please see the pages http://www.kurims.kyoto-u.ac.jp/workshop-e.html

June 2004

The next Han-sur-Lesse meeting on "Functional Analysis and Partial Differential Equation" is foreseen on June 7–8 2004.

3 Summary of PhD theses

A Study of Incidence Structures and Codes
related to Regular Two-Graphs

Elisabeth Kuijken
Ghent University, Department of Pure Mathematics and Computer Algebra
Galglaan 2, B-9000 Ghent, Belgium
ekuijken@cage.UGent.be

supervisor: Prof. Dr. Frank De Clerck
thesis defended on May 23rd, 2003

An incidence structure consists of points, blocks and an incidence relation which expresses when a point lies in a block. By imposing extra conditions, one obtains interesting classes of examples. e.g. (semi)partial geometries, generalised polygons or designs. Two-graphs consist of vertices and triples which are called coherent. They are related to graphs via switching, an operation on the edges. We study incidence structures, (two-)graphs and codes starting from their connections.

Partial geometries play a prominent role. We construct a new infinite class of examples with a Hermitian point graph, and give a geometric interpretation for a class previously constructed by Mathon. A two-graph geometry is a 1-point extension of a partial geometry which has an associated regular two-graph. We show that the symplectic two-graphs do not support a two-graph geometry, except in the smallest case. We also extend

the concept to semipartial geometries and construct a class of examples. Next we investigate a generalisation of (semi)partial geometries: partial linear spaces with a distance-regular point graph.

The (binary) code of a graph is generated by the rows of its adjacency matrix. Upper bounds for the dimension of codes of strongly regular graphs yield non-existence results for regular graphs in the switching class corresponding to certain regular two-graphs. The second smallest Hermitian two-graph $\mathcal{H}(5)$, its code and the associated strongly regular graphs are studied in detail. They have highly interesting properties due to a connection with sporadic objects like the Hoffman–Singleton graph.

Finally we discuss an alternative model for the split Cayley hexagon $H(q)$. It was first described by Bader and Lunardon, and is valid if q is odd and not divisible by 3. By slightly modifying the description, we can extend it to the case where q is divisible by 3.

Berwald-type connections in time-dependent mechanics and dynamics on affine Lie algebroids

Tom Mestdag

Supervisor: Prof. Dr. W. Sarlet defended at June 26, 2003
Department of Mathematical Physics and Astronomy Ghent University

The differential-geometric study of systems of time-dependent second-order differential equations on a manifold (SODEs for short) using connections, is an important branch of the present research in classical mechanics. Every SODE gives rise to an associated non-linear connection for which one can construct a class of "linearized versions", the so-called "connections of Berwald type". Berwald-type connections are used to investigate certain qualitative aspects of a SODE, such as linearizability or separability. In the first part of the thesis we investigate arguments that could lead to the selection of an "optimal" representative within the class of Berwald-type connections.

An important subclass of SODEs are those of Lagrangian type. In a recent article, Weinstein explained how one can define a kind of Lagrangian equations also on a Lie algebroid. In this dissertation we generalize this theory to time-dependent systems. The carrying bundle for achieving this is not a vector bundle, but an affine bundle. We extend the concept of a Lie algebroid to affine bundles. We define dynamical systems of Lagrangian type on such an affine Lie algebroid and we construct a geometrical model in which they can be studied. We further show how such a Lagrangian system generates a "generalized" (non-linear) connection and corresponding "affine" generalized connections. These last connections are, in this context, the analogues of the Berwald-type connections of the first part of the dissertation.

The effects of transformations on second-order regular variation

Giovanni Vanroelen, KUL

July 3, 2003

In 1964 Box and Cox published their trendsetting analysis on the use of transformations in statistics. Since then, the class of Box-Cox power transformations with parameter σ has been an important and versatile tool when reshaping data into a statistically more appropriate form. In this dissertation we investigate the effect of such transformations on the second-order behaviour of the tail quantile function U, by far the most important ingredient in extreme value theory. By the latter we mean the following asymptotic relation: $\forall u > 1 :\ U(ux) = U(x) + h_\gamma(u)a(x) + k(u)b(x) + o(b(x))$, as $x \to \infty$, where a and b are positive auxiliary functions such that $b(x) = o(a(x))$, γ is a real constant and $k(u)$ is not a multiple of $h_\gamma(u)$. During the past years it has become apparent that the regular variation of $a_2(x) := b(x)/a(x)$ (with parameter $\rho \leq 0$ say) is responsible for the appearance in practice of the bias of most estimators for the so-called extreme value index γ.

It will appear that this effect depends on the sign of the quantity γ, but also on the quantity $\gamma + \rho$, at least in case γ is positive. To arrive at this conclusion, going through a wide set of subcases, we need a detailed description of the explicit form of a regularly varying function of second order. Next, we focus on the effect of a Box-Cox transformation on second-order regular variation. As can be expected, the cases $\gamma > 0$ and $\gamma \leq 0$ require a different approach. However, whatever the value of γ, we will repeatedly find situations where the second-order rate of convergence will improve by a proper choice of the parameter σ. Moreover, we will be able to define so-called Box-Cox Hill and Box-Cox Pickands estimators that should prove to have far better bias properties than their predecessors if one is able to make the right choice of the parameter σ. Finally, we

investigate the potential effect of transformations of a more general form than Box-Cox transformations. As an application we will describe how the second-order information changes when one uses different types of quantile functions. In the appendix of this dissertation we also include an additional thesis. The formulation is as follows: the convergence of ratios and differences of two order statistics implies extremal domain of attraction.

4 Mathematical Olympiad

4.1 Solutions to the problems of the previous Newsletter

Olympiades de Taipei 1998, question 4.

Determine all pairs (a, b) of positive integers such that $ab^2 + b + 7$ divides $a^2b + a + b$.

Solution. Soient a et b deux nombres répondant à la question. Posons $m = ab^2 + b + 7$, ce qui, à soi seul, donne

$$b(ab + 1) = -7 (\text{mod } m). \qquad (1)$$

D'autre part, l'hypothèse "$ab^2 + b + 7$ divise $a^2b + a + b$", autrement dit "m divise $a^2b + a + b$", donne

$$a(ab + 1) = -b (\text{mod } m). \qquad (2)$$

En multipliant (1) par a et (2) par b, nous obtenons

$$ab(ab + 1) = -7a (\text{mod } m)$$

et

$$ab(ab + 1) = -b^2 (\text{mod } m),$$

d'où, par comparaison,

$$b^2 = 7a (\text{mod } m).$$

Ainsi, $ab^2 + b + 7$ divise $b^2 - 7a$. On a donc

$$b^2 - 7a = 0 \text{ ou } ab^2 + b + 7 \leq |b^2 - 7a|. \qquad (3)$$

Si tout d'abord $b^2 = 7a$ (4) alors b est divisible par 7. Soit $b = 7c$, avec c naturel. La relation (4) donne $a = 7c^2$. On vérifie réciproquement que, pour tout naturel c, le couple $(a, b) = (7c^2, 7c)$ est une solution. D'après (3), les autres solutions sont telles que $ab^2 + b + 7 \leq |b^2 - 7a|$. On ne peut avoir $ab^2 + b + 7 \leq b^2 - 7a$, car le 1er membre est $> b^2$ et le second membre $< b^2$. On a donc $ab^2 + b + 7 \leq 7a - b^2$, d'où $ab^2 < 7a$, d'où $b^2 < 7$, d'où $b = 1$ ou 2.

Pour $b = 1$, la condition "$ab^2 + b + 7$ divise $a^2b + a + b$" signifie que $a + 8$ divise $a^2 + a + 1$. Comme $a = -8 (\text{mod } a + 8)$, cela revient à ce que $a + 8$ divise 57. Les diviseurs de 57 qui sont > 8 sont 57 et 19, d'où les deux solutions $(a, b) = (49, 1)$ et $(a, b) = (11, 1)$.

Pour $b = 2$, la condition "$ab^2 + b + 7$ divise $a^2b + a + b$" signifie que $4a + 9$ divise $2a^2 + a + 2$. Puisque $4a + 9$ est impair, ceci revient à ce que $4a + 9$ divise $8(2a^2 + a + 2) = 16a^2 + 8a + 16 = (4a)^2 + 2(4a) + 16$. Comme $4a = -9 (\text{mod } 4a + 9)$, ceci revient à ce que $4a + 9$ divise 79. Le seul diviseur de 79 qui soit > 9 est 79, qui n'est pas de la forme $4a + 9$. Il n'y a donc pas de solution pour $b = 2$.

A. Delcour

Remarks on the solution. La solution proposée est parfaitement correcte. Alternativement, on peut éviter d'utiliser le calcul modulo et tout exprimer en termes de divisibilité. Il s'agit juste d'une question de goût...

Philippe Niederkorn
co-leader de l'équipe belge à l'OMI 2003

38th IMO (1997, Mar del Plata), question 2.

Angle A is the smallest in the triangle ABC. The points B and C divide the circumcircle of the triangle into two arcs. Let U be an interior point of the arc between B and C which does not contain A. The perpendicular

bisectors of AB and AC meet the line AU at V and W, respectively. The lines BV and CW meet at T. Show that

$$|AU| = |TB| + |TC|.$$

Solution. Let BV (resp. CW) meet the circumcircle of the triangle ABC again at B' (resp. C').

By symmetry (because V is on the perpendicular bisector of AB), we have $|BB'| = |AU|$ (1) and $\widehat{BAU}^{\circ} = \widehat{ABB'}^{\circ}$. By symmetry again (this time because W is on the perpendicular bisector of AC), we have $\widehat{CAU}^{\circ} = \widehat{ACC'}^{\circ}$. Therefore,

$$\widehat{BB'C}^{\circ} = \widehat{BAC}^{\circ} = \widehat{BAU}^{\circ} + \widehat{CAU}^{\circ} = \widehat{ABB'}^{\circ} + \widehat{ACC'}^{\circ} = \widehat{ACB'}^{\circ} + \widehat{ACC'}^{\circ} = \widehat{B'CC'}^{\circ}.$$

Thus, the triangle TCB' is isosceles, so that $|TB'| = |TC|$. Hence,

$$|AU| \overset{(1)}{=} |BB'| = |TB| + |TB'| = |TB| + |TC|\,.$$

P. Niederkorn

4.2 Belgian team, IMO 2003, Japan

This year's International Mathematical Olympiad took place in Tokyo from July 11 to July 19. Just in case you don't remember, this competition is aimed at secondary school students, and consists of two sets of three difficult problems. Complete solutions (not only answers) have to be provided, and each problem is worth 7 points.

After the students' solutions have been marked, medals are awarded to some of them according to the following two "rules" :

- at most half the students are awarded a medal;
- the numbers of gold, silver and bronze medals should be approximately in the ratio 1 : 2 : 3.

Moreover, an Honorable Mention is awarded to each non-medallist who solved correctly (i.e. received 7 points for) at least one problem.

Here is the detail of our team's results :

Question :	1	2	3	4	5	6	total	result
Bram Gaasbeek	2	3	0	0	0	0	5	
Dries Geebelen	0	1	0	7	0	0	8	Honorable Mention
Timothée Marquis	0	0	0	7	1	0	8	Honorable Mention
Arne Smeets	0	3	0	7	0	0	10	Honorable Mention
Antony Trinh	7	3	0	7	0	0	17	Bronze Medal
Cédric Troessaert	7	7	0	7	1	0	22	Silver Medal

A total of 70 points earns Belgium a 37th place (out of 82) in the unofficial country ranking, dominated this year by Bulgaria.

To give you an idea of our students' feat, this month's problems are the three questions they had to solve on the competition's first day. So just spend four hours and a half — in the students' case, it was 9.00–13.30 — and see what you would have been up to...

Philippe Niederkorn
co-leader of the belgian team, IMO 2003

4.3 New problems

IMO 2003 Japan — First Day

1. Let A be a subset of the set $S = \{1, 2, \ldots, 1000000\}$ containing exactly 101 elements. Prove that there exist numbers $t_1, t_2, \ldots, t_{100}$ in S such that the sets

$$A_j = \{x + t_j \,|\, x \in A\} \quad \text{for} \quad j = 1, 2, \ldots, 100$$

are pairwise disjoint.

2. Determine all pairs of positive integers (a, b) such that

$$\frac{a^2}{2ab^2 - b^3 + 1}$$

is a positive integer.

3. A convex hexagon is given in which any two opposite sides have the following property : the distance between their midpoints is $\sqrt{3}/2$ times the sum of their lengths. Prove that all the angles of the hexagon are equal.

(A convex hexagon $ABCDEF$ has three pairs of opposite sides : AB and DE, BC and EF, CD and FA.)

Philippe Niederkorn
co-leader of the belgian team, IMO 2003

And now, we are waiting for your solutions... Do not forget to send them to F.Bastin@ulg.ac.be for the next issue of our Newsletter, i. e. before November 7, 2003. Thanks!

5 Miscellaneous

Francqui Prize

Last June, Professor Michel Van den Bergh (LUC) was awarded the prestigious Francqui Prize of 100.000 EUR.

Alexander von Humboldt Prize

Under the auspices of the "Fonds National de la Recherche Scientifique" (= Belgian NSF), the Alexander von Humboldt Prize for the period 2003–2004 and 2004–2005 has been conferred to Professor Dr. Dietmar VOGT from the University of Wuppertal. He will stay from April 1st to July 31st 2004 at the Institute of Mathematics of the University of Liège.

J. Schmets
J.Schmets@ulg.ac.be

Call for Nominations of Candidates for ten EMS Prizes

Principal Guidelines

Any European mathematician who has not reached his or her 35th birthday on 30 June, 2004, and who has not previously received the prize, is eligible for an EMS Prize at 4ECM. A total of 10 prizes will be awarded.

The maximum age may be increased by up to three years in the case of an individual with a corresponding "broken career pattern". Mathematicians are defined to be "European" if they are of European nationality or their normal place of work is within Europe. "Europe" is defined to be the union of any country part of which is geographically within Europe or that has a corporate member of the EMS based in that country.

Prizes are to be awarded for the best work published before the 31 December, 2003.

The Prize Committee shall interpret the word "best" using its judgement: e.g., it may refer to innate quality or impressiveness, influence, etc.

Nomination for the Award

The Prize Committee, headed by Professor Nina Uraltseva (St. Petersburg), is responsible for solicitation and evaluation of nominations. Nominations may be made by anyone, including members of the Prize Committee

or by the candidates themselves. It is the responsibility of the nominator to provide all relevant information to the Prize Committee, including a summary and documentation.

The nomination for the awards should be reported by the Prize Committee to the EMS President at least three months prior to the date of the awards. The nomination for each award must be accompanied by a written justification and a citation of about 100 words that can be read at the award ceremony.

The prizes cannot be shared.

Description of the Award

The award comprises a certificate including the citation and a cash prize of 5000 euro.

Award Presentation

The prizes will be presented at the Fourth European Congress of Mathematics by the President of the European Mathematical Society. The recipients will be invited to present their work at the conference.

Prize Fund

The money for the Prize Fund will be raised by the organizers of the Fourth European Congress of Mathematics in Stockholm.

Deadline for Submission

Nominations for the prize must reach the office in Stockholm at the following address no later than the 1 February, 2004:
4ECM Organizing Committee, Prof. Ari Laptev,
Department of Mathematics, Royal Institute of Technology, SE–100 44 Stockholm, Sweden.
E-mails: laptev@math.kth.se, uunur@nur.usr.pu.ru
http://www.math.kth.se/4ecm/
Fax: +46-8-723 17 88, Phone: +46-8-790 84 86

About the SMF

Informations about the SMF (Société Mathématique de France) can be found at the end of this Newsletter.

Théâtre

Reprise au Théâtre du Rideau de Bruxelles du 16 septembre au 3 octobre, et aussi le 7 octobre à 13h et à 20h30 à Arlon, le 8 octobre à Bertrix, le 10 et le 27 octobre à Nivelles, les 13 et 14 octobre à Sambreville, le 16

octobre à Huy, le 17 octobre à Rochefort, le 18 octobre à Ottignies, les 21, 22, 23 et 24 octobre à Fleurus, les 30 et 31 octobre à Andenne

PREUVE de David Auburn

http://www.rideaudebruxelles.be/saison/preuve/resume.html

Prix Pulitzer 2001
Texte français : Isabelle Anckaert
Avec : Alexandre von Sivers, Valérie Marchant, Philippe Allard et Isabelle Defossé
Mise en scène : Jonathan Fox

Les à-côtés

Rencontres théâtre et mathématiques les jeudis 18, 25 septembre et 2 octobre de 19h à 19h45 à Bruxelles.

Jonathan Fox, metteur en scène, et Luc Lemaire, Professeur au département de mathématiques à l'Université Libre de Bruxelles, invitent le public à une rencontre-débat sur l'univers des mathématiques, ses découvertes et ses enjeux. Passionnant. Entrée libre. Réservation conseillée 02/507.83.62

Preuve

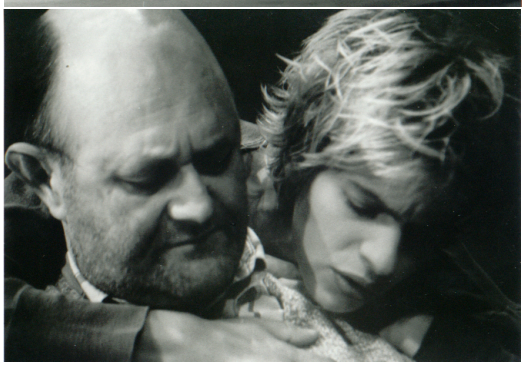
"Du rire, de l'émotion, du suspense et des maths! Voilà un curieux cocktail dont le dosage et la richesse humaine captivent au long cours". Le Vif

En cette nuit d'anniversaire - elle a 25 ans aujourd'hui - Catherine s'adresse à Robert, son père mathématicien génial, pour un ultime entretien. Des années passées ensemble, il reste des carnets couverts de notes confuses qui suscitent l'intérêt de Hal, étudiant fasciné par les découvertes prodigieuses que fit le mathématicien avant que la maladie ne paralyse sa brillante intelligence. Et si l'un d'eux contenait une démonstration essentielle?

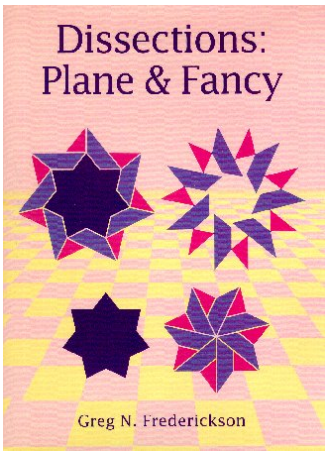
"Sur certains points, nous aspirons tous à ressembler à nos parents et sur d'autres, nous sommes tous inquiets de devenir comme eux." souligne David Auburn.

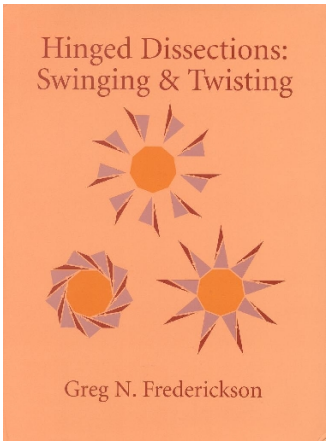
Explorant les liens privilégiés qui se tissent dans une famille, avec ses personnages terriblement touchants, la pièce nous parle moins de sciences exactes que des mystères de la vie, de l'émouvante question de la transmission ou encore de la surprise de l'amour.

"Une pièce riche et originale, un événement théâtral". La Revue générale.



6 Fiction





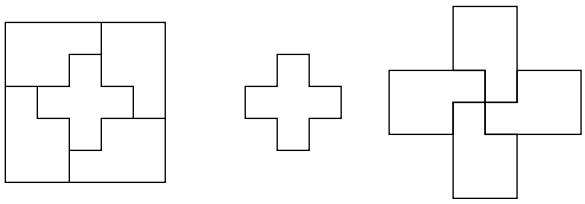
Greg N. Frederickson
Professor computer science,
Purdue University.

Dissections: Plane & fancy, Cambridge University Press, Cambridge, 1997, ISBN 0-521-57197-9 (hardback) and 2003, ISBN 0-521-52582-9 (paperback);

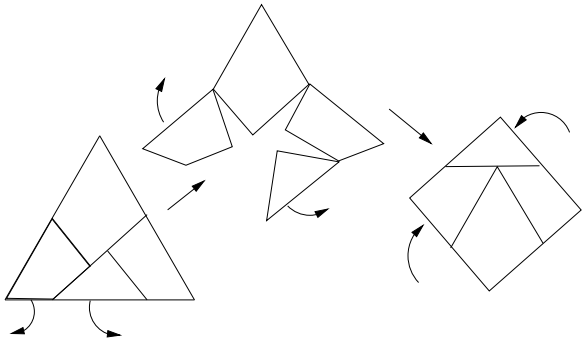
Hinged dissections: Swinging & twisting, Cambridge University Press, Cambridge, 2002, ISBN 0-521-81192-9 (hardback)

The first book of the author on this subject appeared in 1997 in hardback. On the occasion of the publication of his second book, the first book was reprinted as a paperback edition. So we can review both books simultaneously since they became available in their present form almost simultaneously.

Dissections are just a playful way of cutting an reassembling geometrical objects. In the figure on the right you see how a square can be cut into five pieces and reassembled as two crosses. Of course this is just a very simple example and there are many other similar dissections one could imagine, not only of squares, but also of stars, triangles, rectangles, polygons, etc.



To explain what hinged dissections are, it is best to take a look at the figure on the left which represents a hinged dissection of an equilateral triangle to a square. The triangle is dissected and reassembled to form a square. However the extra constraint is that the pieces of the dissection are attached to each other by hinges. This hinged dissection from a triangle to a square with only 4 pieces was described in Henry Dudeney's book *The Canterburry Puzzles* (Heinemann, 1907)[1].



There are many variations possible on this idea: sometimes the transform is to a figure with a hole, so there are hinged dissections from a figure to two other figures (the hole and the rest of the figure). Again, possible figures are triangles, squares, polygons, stars, etc. but also dissections with curved boundaries are discussed. Also cases where some of the pieces are allowed to be flipped, and 3D variants of these puzzles are treated. The author gives several techniques for constructing some of the dissections (this is e.g., related to overlapping tesselations of the plane), and he also gives a lot of historical remarks. Many of these puzzles have indeed a long history. Where possible the original inventor of a dissection puzzle was given credit where possible. In fact since he wrote his first book he set up a website

`http://www.cs.purdue.edu/homes/gnf/book.html`

and he had a lot of feedback that is often included in the second book. The first one may give some details on some of the puzzles, but the second one is greatly self-contained. Thus it is not at all necessary to read the first book first. Also his website with many links to webpages about dissections and related puzzles (many of them are animated and illustrate much better the swinging of the pieces than what we attempted above) is worth a visit. See

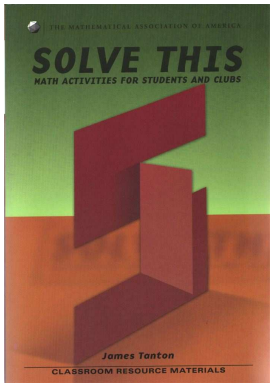
`http://www.cs.purdue.edu/homes/gnf/book/webdiss.html`

[1] A revised edition was published by Dover Publications in 1958.

These books give many new perspectives for all those who love math puzzles. They will adore the second book as much as they loved the first, and they will devour it with great enthusiasm. The style is lively and pleasant to read. Practically no mathematical prerequisites are needed, so that everybody can be intrigued by this fascinating play of fancy pieces swinging and twisting around.

A. Bultheel

J. Tanton. *Solve This. Math Activities for Students and Clubs* (). Classroom Ressource Materials. The Mathematical Association of America, (2001). xiv+218 pages. paperback, ISBN 0-88385-717-0, $29.95.



This book is a collection of mathematical problems and activities for young students and mathematical clubs. It is intended to be a source of classroom activities involving objects from our everyday experience. Everything here is done to show us that "mathematics is all around us, and it's funny!".

In the introduction, the author points out that "the mathematical process is one of investigating and unfolding sequential layers of depth, finding new perspectives and new applications". For that reason, he chooses to divide the book in three parts. The first one is devoted to the presentation of the mathematical activities and to the problem statements. They are organized according to the topic (or to what kind of objects are involved in the activities). Many activities and problem descriptions ends with a "Taking It Further" section. Part two is called "Hints, Some Solutions and Further Thoughts". It is here where the author introduces the mathematical objects and language, and try to link them to the activity considered. The idea is to suggest which mathematics are behind each problem. Finally, part three contains the solutions and many mathematical discussions around each problem, with, each time, sources for further readings. Everything in the book is fully illustrated with many figures and pictures.

This book is without any doubts a nice invitation to "experimental mathematics". It is intended to high school and first year college students. The exposition is simple and very clear. But despite its simple language, any mathematician will find here many moments of joy reading and discovering how simple it is sometimes to understand and teach high level mathematics.

Emmanuel Fernandes

7 The end ...

Statistics Canada is hiring mathematicians.Three recent graduates are invited for an interview: one has a degree in pure mathematics, one one in applied math, and the third a B.Sc. in statistics. All three are asked the same question: "What is one third plus two third?"

The pure mathematician: "It's one."

The applied mathematician takes out its pocket calculator, punches in the numbers, and reply: "It's 0.999999999."

The statistician: "What do you want it to be?"

Why mathematicians are afraid drive a car? Because the width of the road is negligible comparing to its length.

Société Mathématique de France –

by Michel Waldschmidt

Mathematics is an international adventure and mathematicians are used to cooperating with other specialists from all around the world. We maintain close links with colleagues from far removed countries, but sometimes we should consider also strengthening our ties with geographically closer neighbors. For us, members of Belgian Mathematical Society and Société Mathématique de France, who live in neighboring countries, it is clear that we should know each other better and interact better. The aim of the present message is to introduce SMF to the members of BMS.

The SMF.

Société Mathématique de France was created in 1872 by Michel Chasles, who happened to be the first French member of the London Mathematical Society. He became the first president, elected for one year. In the first issue of the Bulletin, the statutes claim that the purpose of this new learned society is to promote the progress of science and to propagate the studies of pure and applied mathematics. This is to be done by the activities of the society and the publication of the memoirs of its members.

Our society was created to serve as a tie between French mathematicians, quite a small almost family-size community at that time. The number of mathematicians working in France now exceeds 5000 and our society includes around 2000 members.

Publications

One important goal of SMF, from the beginning, has been mathematical publication. In 1873, just one year after SMF was created, the first issue of the *Bulletin de la Société Mathématique de France* appeared. Now, besides the paper version, an electronic version of the Bulletin is available for subscribers to the printed issues. Since 1964 the Bulletin has been completed with a supplément, the *Mémoires,* devoted mainly to monographs. *Astérisque*, created in 1973 on the occasion of the first centenary of the French Mathematical Society, publishes monographs as well as proceedings of big international conferences and Bourbaki seminars. The *Revue d'Histoire des Mathématiques* was founded in 1995. Further series include *Panoramas & Synthèses* (survey monographs at a high level), *Cours Spécialisés* (courses at the graduate level for doctoral students) as well as *Séminaires & Congrès*, the electronic version of which is freely accessible on the web site. *Documents Mathématiques* has just started: one of the first volumes, published in 2001, includes the correspondence between Grothendieck and Serre and has been quite successful; an agreement for an English translation has just been signed between SMF and the American Mathematical Society. Besides these series, sporadic volumes have been published by SMF, in particular a reedition of the Bourbaki Seminars from 1948 to 1968. Our society is now the main publisher in France for mathematical books and journals at a high level, mostly in French. However, we have now an agreement with the AMS for translation and distribution of some monographs : this is the series *SMF/AMS Texts & Monographs.*

Digitisation is a concern of all publishers nowadays. We rely on the *NUMDAM* programme (*numérisation de documents mathématiques*) which is leadead by the Cellule MathDoc in Grenoble and participates to the international project of the Digital Mathematical Library.

Meetings

We have a "Journée Annuelle" one Saturday in the middle of June, where the official yearly

General Assembly takes place, followed by scientific activities featuring 3 or 4 lectures on a topic of general interest. For instance, in 2001 the topic was "Mathématiques et Mathématiciens au XXème siècle", in 2002, the theme was "Mathematical Biology", in 2003 it was "Groups and Geometry" while for june19, 2004 it will be "Operational Research".

This annual meeting gives us also the opportunity every second year to attribute the *d'Alembert Prize* of SMF which is awarded to a work which raises public awareness of mathematics. In 2002 we also awarded the *Prix Anatole Decerf 2002* of the *Fondation de France* whose aim is to promote the pedagogy of mathematics. Three years ago we celebrated World Mathematical Year 2000 by awarding four special prizes *Prix d'Alembert des Lycéens* for lectures presenting actual mathematics within the reach of high school students. Given the success it had, we may repeat it later.

Every year SMF organizes two "sessions de la recherche", where specialists on a given subject introduce the state of the art to other mathematicians and to graduate students. On 12-15 december 2001 at the University of Nantes the subject was "Polynomial functors, unstable modules and the cohomology of finite group schemes", while in May 2002 at Paris Nord it was "Random Schrdinger operators: methods, results and perspectives". In june 2003 the topic was "Stochastic Aspects of Vision".

Some of these lectures are published afterwards in *Panoramas et Synthèses*.

We run a number of international conferences with other learned societies: in Lyon (July 2001) with AMS, in Nice (February 2003) with EMS (*European Mathematical Society*) and SMAI (*Société de Mathématiques Appliquées et Industrielles*), in Toulouse (July 2004) with SMAI again, SFdS (*Société Française de Statistique*), CMS (*Canadian Mathematical Society*) and CSS (*Canadian Statistical Society*).

Education

SMF is active in all questions which are related with mathematics. Therefore education problems are one of our main concerns. SMF contributed to the creation of a think-tank on the teaching of mathematics, which was later officially launched by the Minister of Education who nominated a committee with Jean-Pierre Kahane as President. A report of its work was published in 2002 ("L'Enseignement des Sciences Mathématiques", Éd. Odile Jacob) and is being translated into English.

The school teaching program deserves the attention of professional mathematicians, but it is also important to introduce mathematics on a lighter basis to high school students: this is the goal of a number of associations created or supported by SMF, like *Animath* and *Math en Jeans*, where young people enjoy their free time by doing mathematics.

Every year the Committee for Education of SMF runs a meeting to study the current situation. In january 2002 a round table took place on the theme "Mathématiques et enseignement des sciences", while in january 2003 we dealt with the forthcoming reform of academic education: *"Les Mathématiques dans les nouveaux cursus universitaires" (licence master doctorat)*. Also we keep contacts with organizations such as APMEP (*Association des Professeurs de Mathématiques de l'Enseignement Public*, an Association of High School Mathematics Teachers) and UPS (*Union des Professeurs de Spéciales*).

CIRM in Luminy

Mathematicians need to work together, either in small groups, or by participating in conferences, which is why SMF created the CIRM (*Centre International de Rencontres Mathématiques*) in Luminy in 1981. This is an Oberwolfach-like institute — the superb surrounding of the Black Forest being replaced by the proximity of the Mediterranean Sea and the Calanques —, and the main idea is the same, namely to offer to mathematicians the best possible conditions for working together. See the note below for more details. The task of this center of research and training is to organize international

meetings bringing together mathematicians and researchers in related fields from France and all over the world. Also it serves for the training of young researchers through intensive courses or summer courses. The capacity has been increased recently, and more than 60 people can be accommodated. Further works are taking place and a new auditorium is under construction.

Relations with other learned societies

I mentioned the SMAI, which was founded in 1983 by a group of French applied mathematicians. Our two societies have close links, and a number of joint activities are taking place. One of them (also with SFP: *Société Française de Physique*) is towards cooperation with developing countries, where our three societies just created a joint committee "Sciences de Base et Coopération" for that purpose. France hosts the CIMPA (*Centre International de Mathématiques Pures et Appliquées*) which organizes schools in many developing countries and our societies support its activity. Lack of funds for this institution is always the main difficulty, despite the support of UNESCO.

A booklet called *Explosion des Mathématiques* was released in July 2002 thanks to the joint efforts of SMF and SMAI; the goal is to promote mathematics to a wide audience. You may download it free from the SMF server.

Nowadays communication plays an essential role in all circumstances. For communication inside the French mathematical community, the *Officiel des Mathématiques* (freely available on the web site of SMF since 1998) provides information on seminars every month, and our *Gazette des Mathématiciens* is analogous to your Newsletter: it gathers information on different topics of interest for our members.

Our website
http://smf.emath.fr

displays further information on our society, with a directory of members, on-line order forms for books and journals, information concerning our publications, conferences, meetings, and much more.

A joint conference BMS/SMF/SML/WG gathering mathematicians from Belgium, France, Luxemburg and Netherlands is scheduled for 2005. I feel happy of this opportunity which is given of tightening the links between our mathematical communities.

Our two societies, SMF and BMS, have reciprocity agreements. We welcome members of BMS to join SMF as reciprocity members.

Michel Waldschmidt
Président de la Société Mathématique de France

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CIRM, by Robert Coquereaux

The Centre International de Rencontres Mathématiques (CIRM), situated in Luminy, Marseille, hosts a number of conferences every year in mathematics and related fields (theoretical physics, computing, AI, information theory, mathematical biology etc.). CIRM offers conference rooms, standard video and specialized computing facilities. Its mathematical library is the biggest in the south of France (70 000 volumes).

CIRM is located on the Luminy Campus, between the city of Marseille and the summer resort of Cassis. CIRM can house up to 80 people and its restaurant serves about 90 guests. The dimension of CIRM is international, but also regional, as it plays a prominent role within the universities and research institutes in the Marseille area. CIRM is a "Unité Mixte" under the common responsibility of the CNRS (Centre National de la Recherche Scientifique) and the SMF (Société Mathématique de France).

The CNRS and the French Ministry of Research primarily sponsor it. The governing body of CIRM consists of Scientific Council, Administrative Council and a Director.

The first purpose of CIRM is to welcome one-week scientific gatherings of 30 to 60 people; the duration of such a CIRM conference is typically one week. It is possible to organize longer meetings, thematic schools for example. There is also another program (which started in 2001) of the type "Research in Teams", with the possibility of offering scientific and housing facilities for small research groups.

Every year CIRM welcomes approximately 10000 visitors × days, and about 50 conferences in the domain of mathematics and related fields. Financial support for conferences can be obtained from CIRM, after the decision of Scientific Council that meets twice a year. This support takes the form of a number of free CIRM-days (typically 40% of the total number of CIRM-days used by a given conference).

Robert Coquereaux
Centre International de Rencontres Mathématiques (Directeur)
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13288 - Marseille - France
(0)4 91 83 30 22
http://www.cirm.univ-mrs.fr/

Shoshana J. Wodak (Université Libre de Bruxelles)
Bridging the molecular and systems level views in the post-genomic era: Role of bioinformatics

Over one hundred or so complete genomes, of species ranging from bacteria to man, have now been sequenced and many more are in the pipeline. This flow of information is changing the way in which research in all fields of biology is performed. Until recently most biochemists and molecular biologists focused on the properties of single genes and proteins involved in individual biological processes. Now, it becomes possible to study how the individual genes and gene products co-operate to build up complex cellular structures and to perform all the elaborate processes that enable cells and organisms to live and reproduce themselves. This is an enormous challenge that requires multidisciplinary efforts and new systems-level approaches, ideally grounded on molecular level understanding. Computational biology and bioinformatics have a key role to play in these new developments. This role will be illustrated with several examples from our own work.

The study day is organized as an Academy Contact Forum. Its proceedings will be published by the Academy.

- Jef Teugels (jef.teugels@wis.kuleuven.ac.be)
- Adhemar Bultheel (adhemar.bultheel@cs.kuleuven.ac.be)
- Jef Thas (jat@cage.rug.ac.be)

Organization:

- The National Committee for Mathematics
- The Belgian Mathematical Society
- The Scientific Research Network Advanced Numerical Methods for Mathematical Modeling

Sponsors:

- Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten
- Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique
- The Scientifc Research Network Advanced Numerical Methods for Mathematical Modeling

Registration:

Participation is free of charge, but registration is required for practical reasons. Please send an email before October 1, 2003 to

adhemar.bultheel@cs.kuleuven.ac.be

Venue

Academy House, Hertogsstraat/Rue ducale 1, Brussels

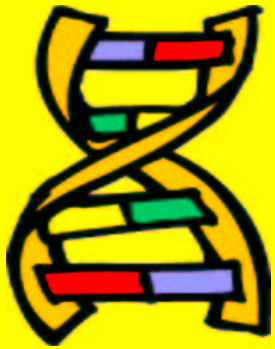
Royal Palace

train: Walk from Brussels Central Station
metro: Leave at *Troon*

Mathematics & Genomics

Academy House
Hertogsstraat/Rue ducale 1
Brussels

October 18, 2003



www.cs.kuleuven.ac.be/conference/genomics/

Program:

09.30 - 10.00h Coffee
10.00 - 10.50h
David Balding
(Imperial College, London)
Inferring haplotypes from genotypes

10.50 - 11.20h Coffee
11.20 - 12.10h
Alessandra Carbone
(Université Paris 6)
Codon bias and the space of microorganisms

12.10 - 14.00h Lunch
14.00 - 14.50h
Bart De Moor
(K.U.Leuven)
Bioinformatics: Organisms from Venus, Technology from Jupiter, Algorithms from Mars

15.05 - 15.55h
David Rand
(University of Warwick)
Design principles behind complex circadian clocks

15.55 - 16.25h Coffee
16.25 - 17.15h
Shoshana J. Wodak
(Université Libre de Bruxelles)
Bridging the molecular and systems level views in the post-genomic era: Role of bioinformatics

17.15 - 18.15h Reception

Abstracts

David Balding (Imperial College, London)
Inferring haplotypes from genotypes

Genetic data from humans and other diploid organisms usually come in the form of genotypes: for each individual i there is a sequence of unordered allele pairs (A_{ij1}, A_{ij2}), $j = 1, ..., J$, where j indexes chromosomal locations (loci). One allele in each pair is maternal in origin, the other paternal, but parent-of-origin information is usually not available. However, if the loci are close together on a chromosome, for example multiple genetic markers within or flanking a single gene, then many methods of analysis require haplotype data, which amounts to ordering each allele pair so that the A_{ij1}, $j = 1, ..., J$, all come from the same parent of individual i. I will briefly review algorithms and software developed by other authors for inferring haplotype data from population samples of the genotypes of unrelated individuals. I will also describe joint work with Laurent Excoffier (Univ. Bern) in which we develop a novel algorithm that is designed to perform well for larger genomic regions and/or high levels of recombination, including recombination hot-spots.

Alessandra Carbone (Université Paris 6)
Codon bias and the space of microorganisms

Proteins are formed out of 20 amino-acids which are coded in triplets of nucleotides, called codons. The four nucleotides (A,T,C,G) define 64 codons used in the cell. Codons are not uniformely employed in the cell, but at the contrary, certain codons are preferred and we speak about codon bias. There are several kinds of codon biases and some of them are linked to specific biological functions. Based on some simple mathematical ideas on sequence analysis we can detect dominating codon bias in prokaryotic and eukaryotic organisms of any kind, and define a formal framework to interpret genomic relationships derived from entire genome sequences rather than individual loci.

Bart De Moor (K.U.Leuven)
Bioinformatics: Organisms from Venus, Technology from Jupiter, Algorithms form Mars.

In this lecture we discuss datasets that are being generated by microarray technology, which makes it possible to measure in parallel the activity or expansion of thousands of genes simultaneously. We discuss the basics of the technology, how to preprocess the data, and how classical and newly developed algorithms can be used to generate insight in the biological processes that have generated the data. Algorithms we discuss are Principal Component Analysis, clustering techniques such as Hierarchical Clustering and Adaptive Quality Based Clustering and statistical sampling methods, such as Monte Carlo Markov Chains and Gibbs Sampling. We illustrate these algorithms with several real-life cases from diagnostics and class discovery in leukemia, functional genomics research on the mitotic cell cycle of yeast, and motif detection in Arabidopsis thaliana using DNA background models. We also discuss some bioinformatics software platforms. We end our presentation by presenting some future perspectives on the development of bioinformatics, including some visionary discussions on how technology, algorithms, systems biology and computational biomedicine will evolve.

David Rand (University of Warwick)
Design principles behind complex circadian clocks

I will discuss some mathematical results relating the structure of the associated regulatory networks to the functions of the clock. A basic problem is to understand the roles of the interlocking positive and negative feedback loops