



# Belgian Mathematical Society

Comité National de Mathématique CNM

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NCW Nationaal Comité 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 32, March 15, 2001

Our colleague Pascal Laubin died on February 21st; he was 42 years old. He had just been promoted Professeur ordinaire at the University of Liège. He was an active member of the Committee of the Belgian Mathematical Society since 1992 and a member of the Editorial Board of the Bulletin of the Belgium Mathematical Society - Simon Stevin. Partial differential equations were his main field of interest and he was already well known for his results. We loose a brilliant mathematician, a clever and kind colleague, a friend. The Belgian Mathematical Society presents its condolences to his relatives and assures Françoise of its heartfelt sympathy.

## News from the BMS

### The Bulletin indexed in the Science Citation Index Expanded

The Editorial Board of the Bulletin proudly announces that the Bulletin of the Belg. Math. Soc. - Simon Stevin has been given, for the year 1999, an impact factor of **0.346** in the ISI *Science Citation Index Expanded*. With this remarkable result, the Bulletin ranks 76th in a list of 145 mathematical journals.

### Membership

At the time of this writing, 22 new members joined the BMS. The BMS Committee is pleased to welcome:

Bernou Jean-Louis (Fresnes, France)	Caubergh Magdalena (LUC)	Chareyre Sébastien (Noisiel, France)
Crama Yves (ULg)	Daili Noureddine (Sétif, France)	Dehaye Paul-Olivier (ULB)
Delhez Eric (ULg)	De Maesschalk P (LUC)	Devillers Alice (ULB)
Dispa Sophie (ULg)	Elskens Yves (Univ. de Provence, Marseille)	Fiorini Samuel (ULB)
Gilson Olivier (ULg)	Glineur François (FPMS)	Govaerts Patrick (RUG)
Lefebvre Michel (Lille, France)	Rigo Michel (ULg)	Roisin Jean-Roger (UCL)
Stiénon Mathieu (ULB)	Stulens Koen	Van Camp Ellen (KULeuven)
Zhang Yinhua (UIA)		

At the time of this writing also, **99 members** have not yet renewed their membership for 2001; they are kindly asked to pay their dues as soon as possible.

For details on membership fees and reciprocity agreements see Issue #31 of BMS-NCM NEWS (January 15, 2001) or the site <http://www.ulb.ac.be/assoc/bms/bms.org.html#dues>

## 2001 BMS-DMV Meeting

### FIRST JOINT MEETING OF THE BELGIAN (BMS) AND GERMAN (DMV) MATHEMATICAL SOCIETIES

#### LAST MINUTE INFORMATION

The FINAL deadline for the submission of abstracts is **MARCH 31, 2001**.

The reduced registration fee still applies until **MARCH 16, 2001**.

For detailed information on the meeting see:

- Issue #31 of BMS-NCM NEWS (January 15, 2001)
- The homepages:

<http://math-www.uni-paderborn.de/Liege2001/>  
<http://www.ulg.ac.be/sectmath/DMVSMBMain.html>

which will be updated from time to time and which will contain some useful links.

#### LOCAL ORGANIZING COMMITTEE:

F. Bastin, J. Schmets (both Univ. Liège).

We look forward to seeing you at the meeting in Liège.

For the BMS and the DMV:

Klaus D. Bierstedt, Jean Schmets

## Doctoral courses in the Flemish Universities

In the frame of a series of doctoral courses on mathematics organized by the Flemish universities a course on **Algebraic Topological Methods in Dynamical Systems** will be organized during the second semester of the academic year 2000-2001. The program of this course is as follows:

- 1 Thursday March 22, 2001, 14h30-16h30

**A. Vanderbauwhede:** *Introduction to Dynamical Systems*

During this introductory lecture a number of concepts from the theory of dynamical systems (such as limit sets, invariant manifolds, hyperbolicity, etc.) , needed for the main courses (see (2)), will be introduced.

**Place:** Room 36, Galglaan 2, 9000 Gent (see <http://cage.rug.ac.be/foto/map.html>)

- 2 April 2-6, 2001, LUC Diepenbeek

Intensive Course Week, with the following courses:

- **Konstantin Mischaikov** (Georgia Institute of Technology): *Conley Index Theory and Rigorous Computations*

- **Stefano Luzzatto** (Imperial College): *From Invariant Manifolds to Invariant Measures* For further information: see <http://www.luc.ac.be/dysy/course>

3 Monday Juni 11, 2001, Galglaan 2, 9000 Gent

Dynamical Systems Day

Speakers: **Floris Takens** (Groningen), **Bernold Fiedler** (Berlin), **Robert Roussarie** (Dijon)

The detailed schedule and the titles of the lectures will be announced later. This day will be organized with the support of the Onderzoeksgemeenschap FWO **Fundamentele Methoden en Technieken in de Wiskunde**.

4 There is a possibility that the foregoing activities will be complemented by a lecture of **Matthias Kowski** (Arizona State University) on the use of computer algebra and multimedia techniques in the study of dynamical systems; this lecture will be organised by **Ivan Cnop** at the VUB.

For further information please contact

**André Vanderbauwhede**: [avdb@cage.rug.ac.be](mailto:avdb@cage.rug.ac.be)

**Freddy Dumortier**: [freddy.dumortier@luc.ac.be](mailto:freddy.dumortier@luc.ac.be)

## Séminaire interuniversitaire de logique mathématique

The **DEA** course (11.00 - 12.30) and the seminars (14.30 - 16.00) take place at the ULB, Campus Plaine, Bldg NO, room 2NO906

The next **DEA** lecture will be given by **Françoise Point** (UMH), on March 22, 2001 at 11.00.

The following afternoon seminars are:

March 22, 2001, 14.30 **Didier Misercque** (Institut Meurice): *Problèmes de mariages*

April 26, 2001, 14.30 **Diderik Batens** (RUG): *Extending the Realm of Logic. The Adaptive Logic Programme.*

**Note also:**

**Journée de Mathématique et de Sciences à Mons**

**March 29, 2001**

Expositions de Posters et sculptures mathématiques dans la cour du "Pentagone"  
organisé dans le cadre du **Printemps des Sciences**

The programme of the Seminar is regularly updated at

<http://www.umh.ac.be/math/logic/seminars.htm>

## The Scientific Works of Charles-Jean de La Vallée Poussin

The first volume of the complete works of Charles-Jean de La Vallée Poussin has just been published, a co-edition of the *Académie Royale de Belgique* and the *Circolo Matematico di Palermo*. Its exact title is

"Charles-Jean de La Vallée Poussin.- Collected Works - Oeuvres scientifiques - vol. I - Biography and Number Theory - Biographie et théorie des nombres"

The scientific editors are Paul J. Butzer (Aachen), Jean Mawhin (Louvain-la-Neuve) and Pascale Vetro (Palermo). The volume is devoted to the biography of de La Vallée Poussin and his work in number theory. The biographical part contains the following contributions :

- P. BUTZER and J. MAWHIN : A biography of Charles-Jean de La Vallée Poussin
- CH. A. DE LA VALLÉE POUSSIN : Charles-Jean de La Vallée Poussin : l'homme, sa vie et sa pensée
- J. MAWHIN : The mathematical environment of Charles-Jean de La Vallée Poussin at the *Université Catholique de Louvain*

- P. BUTZER and J. MAWHIN : Charles-Jean de La Vallée Poussin and the *Académie Royale de Belgique*
- P. NASTASI : Some remarks on the connections between Charles de La Vallée Poussin (and Landau and Lebesgue) and Italian scientific and academic institutions
- P. MONTEL : Notice nécrologique sur Ch.-J. de La Vallée Poussin
- G. LEMAÎTRE : Charles Jean de La Vallée Poussin
- J.C. BURKILL : Charles-J. de La Vallée Poussin
- J. FAVARD : Hommage à Charles de La Vallée Poussin
- CH.J. DE LA VALLÉE POUSSIN : Complete list of publications

The part devoted to number theory contains the following two introductions

- T.M. APOSTOL : Contributions by Charles-Jean de La Vallée Poussin to the theory of numbers
- J. MAWHIN : A note of de La Vallée Poussin on the prime number theorem in a publication of von Mangoldt,

followed by all de La Vallée Poussin's papers devoted to the theory of numbers, and in particular to the prime number theorem.

The next three volumes will respectively contain the contributions of de La Vallée Poussin to

- Integration, Fourier series and differential equations
- Approximation theory
- Conformal mappings, potential theory and complex functions,

together with presentations by experts in the fields.

The price of Volume 1 is 100.000 Italian lires (Euro 52). It must be ordered at the following address : Circolo Matematico di Palermo Via Archirafi 34 90123 Palermo Italy

## FNRS Contact Group at the UCL and ULB

The traditional meeting **Analyse Non Linéaire** will take place  
on **Friday March 30, 2001**

at the UCL in the morning (Institut de Mathématique, Chemin du Cyclotron 2, room Cycl 05) and  
at the ULB in the afternoon (Campus Plaine, room 2NO906, 9th floor, Bldg NO)

### Tentative Programme

09.30-10.30: **Bernard Kawohl** (Univ. Köln, Germany): *Symmetry questions in PDE.*

11.00-12.00: **Gunther Lumer** (UMH): *Transformée de Laplace, EDP's et aspect de la théorie du contrôle.*

14.30-15.30: **Philippe Clément** (Univ. Delft, The Netherlands): *Existence, a priori estimates and symmetry properties of positive solutions to  $p$ -Laplace systems.*

16.00-17.00: **Isabelle Catto** (CEREMADE, Univ. Paris-Dauphine): *A Hartree-type variational problem for crystals.*

Lunch, offered by the FNRS, will be served at the ULB. If you plan to attend it, please inform J.-P. Gossez (e-mail: gossez@ulb.ac.be) before March 28, 2001.

The meeting is organized in the scope of the Contact Group **Équations aux Dérivées Partielles et Semi-Groupes**

## PhD. Thesis at the ULB

**Author:** AZIZIEH Kadija

**Title:** A priori estimates, continuation methods and existence results for positive solutions of p-Laplace equations and systems

**Place:** Campus Plaine, Bldg NO, 9th floor, room 2NO906

**Date:** March 29, 2001

**Time:** 16.00

### Abstract

Our purpose in this thesis is to establish some existence results, a priori estimates as well as symmetry results for nonlinear elliptic partial differential equations involving the p-Laplacian operator. This operator, defined by  $\Delta_p$ , is defined for  $1 < p < \infty$  by the following:

$$\Delta_p : W_0^{1,p}(\Omega) \rightarrow W^{-1,p'}(\Omega) : u \rightarrow \operatorname{div}(|\nabla u|^{p-2} \nabla u)$$

where  $\Omega$  is a bounded domain of  $\mathbb{R}^N$ ,  $N \geq 1$ . This quasilinear operator becomes the usual Laplacian  $\Delta = \sum_{i=1}^N \frac{\partial^2}{(\partial x_i)^2}$  if  $p = 2$ . It appears in some physical and mechanical problems, such as in glaciology or in fluid mechanics, in the study of nonnewtonian fluids. It also appears in the context of Sobolev spaces as the derivative of the Sobolev norm.

In the first chapter, we consider the problem:

$$\begin{cases} -\Delta_p u = f(u) & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega \end{cases} \quad (1)$$

where  $1 < p \leq 2$ ,  $\Omega$  is a bounded convex domain of class  $C^2$  and  $f : \mathbb{R} \rightarrow [0, +\infty)$  is continuous on  $[0, +\infty)$  and locally Lipschitz continuous on  $(0, +\infty)$  and satisfies

$$\exists C_0, C_1 > 0 \text{ such that } C_0|u|^q \leq f(u) \leq C_1|u|^q \quad \forall u \in \mathbb{R}^+ \quad (2)$$

where  $q > p - 1$ . We prove the existence of a nontrivial positive solution for (1) by using a continuation method and by establishing a priori  $L^\infty$  estimates. These estimates are obtained by using a blow-up technique as well as the moving hyperplanes method.

In the second chapter, we obtain partial results concerning nonvariational problems of the type:

$$\begin{cases} -\Delta_p u + \vec{b} \cdot \nabla u = f(u) & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega \end{cases} \quad (3)$$

where  $\vec{b} \in C^1(\bar{\Omega})$  avec  $\operatorname{div}(\vec{b}) \leq 0$  and  $f : \mathbb{R} \rightarrow [0, +\infty)$  is a continuous function satisfying (2) with  $q > \max\{p - 1, 1/(p - 1)\}$  if  $\vec{b} \neq 0$ . We extend for this purpose some properties of the p-Laplacian to the operator  $-\Delta_p + \vec{b} \cdot \nabla$ .

In the third chapter, we prove the existence of a nontrivial positive solution for the system

$$\begin{cases} -\Delta_{p_1} u = f(v) & \text{in } \Omega, \quad u = 0 \quad \text{on } \partial\Omega \\ -\Delta_{p_1} v = g(u) & \text{in } \Omega, \quad v = 0 \quad \text{on } \partial\Omega \end{cases} \quad (4)$$

where  $p_1, p_2 \in (1, 2)$  or  $p_1 > 1, p_2 = 2$ , and where  $f, g : \mathbb{R} \rightarrow \mathbb{R}^+$  are continuous on  $[0, +\infty)$  and locally Lipschitz continuous on  $(0, +\infty)$  and nondecreasing functions satisfying

$$C_1|s|^{q_1} \leq f(s) \leq C_2|s|^{q_1}, \quad D_1|s|^{q_2} \leq g(s) \leq D_2|s|^{q_2} \quad \forall s \in \mathbb{R}^+$$

for some constants  $C_1, C_2, D_1, D_2 > 0$  and  $q_1 q_2 > (p_1 - 1)(p_2 - 1)$ . We use as in the first chapter a continuation method and we obtain a priori estimates by blow-up. To apply this last technique, we prove by using the moving hyperplane method some symmetry result for (4), result allowing us to locate the global maxima of  $u$  and  $v$ .

## Vacancy for a mathematician at the VUB

Vacature Nummer : WE / 2001 / 005

Faculteit : Wetenschappen

Betrekking : Zelfstandig Academisch Personeel

Intern of Extern : Extern

Mandaat : Voltijds Zelfstandig Academisch Personeel

Ingangsdatum : 01/10/2001

Vakgebied : Wiskunde

Omschrijving :

a) Onderwijs :

- Onderwijs op kandidatuurniveau (90 HOC + 90 WPO) betreffende lineaire algebra, analytische meetkunde, analyse, gericht tot niet wiskundigen uit opleidingen behorende tot de exacte -en toegepaste wetenschappen.
- Hogere analyse (30 HOC + 15 WPO), 2e lic.
- Wiskunde Keuzevakken aansluitend bij het onderzoek (60 HOC), 1e en 2e lic. Wiskunde

b) Wetenschappelijk onderzoek : Onderzoek in een domein van de wiskunde gericht naar de Analyse

Vereisten : diploma doctor in de wetenschappen (wiskunde) of van geaggregeerde hoger onderwijs

Contactpersoon : Prof. Dr. E. Colebunders, Contact Telefoon : 02/629 3486 - Secr. 02/629 3471

Contact E-mail : [evacoleb@vub.ac.be](mailto:evacoleb@vub.ac.be)

Naam Decaan : Prof. Dr. J. Lemonne

Inwachtingstermijn : 1 maand na publicatie in het Belgisch Staatsblad

Publicatiedatum Belgisch Staatsblad : 29/02/2001

De kandidaten worden verzocht gebruik te maken van het daartoe bestemde kandidaatstellingsformulier met verklaring vrij onderzoek en cumulatief formulier dat kan gedownload worden op het internetadres <http://www.vub.ac.be/DP/AP.html>

of bekomen worden op de Dienst Personeel (tel. 02/629.20.02) van de Vrije Universiteit Brussel, Pleinlaan 2 te 1050 Brussel.

En ingevuld kandidaatstellingsformulier dient gericht te worden aan de Rector van de Vrije Universiteit Brussel. En kopie van het kandidaatstellingsformulier dient gelijktijdig gericht te worden aan de Decaan van de Faculteit.

## Art et Mathématique ou la rencontre de deux univers

The *Musée des sciences et des techniques de Parentville* and the *Musée des Beaux-Arts de Charleroi* jointly organize, from **February 9** till **June 3, 2001** the following exhibitions:

- At the Musée des sciences et techniques de Parentville:

**Maths 2000** an exhibition of the "Cité des Sciences et de l'Industrie - La Vilette (Paris)

**Symétries du monde. Rencontre de la géométrie, de l'art et de l'anthropologie**, an exhibition organized by the students in Social Sciences of the U. L. B.

- At the Musée des Beaux-Arts de Charleroi: **Méthode et Langage**

As a complement to the exhibitions, the two museums also organize conferences (in French):

- At the Musée des sciences et techniques de Parentville:

March 22, 2001, 14.00 **Luc Lemaire** (ULB): *La Recherche en mathématique*

March 27, 2001, 14.00 **Michel Demal** (UREM-ULB, GEPEMA-HMH, HECF-Mons): *Les polyèdres à faces non planes*

March 29, 2001, 14.00 **Christine De Mol** (ULB) *Mathématique, son et image*

April 24, 2001, 14.00 **Jean-Paul Doignon** (ULB) *Mathématique et cinéma*

- At the Musée des Beaux-Arts de Charleroi:

May 3, 2001, 10.00 and 14.00 **Marc Feulien** (artist) : *Le carré, le cube et la matière*.

For further information and reservations

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See also <http://www.ulb.ac.be/musees/parentville/>