

# Notices from the ISMS

( Novae Scientiae Mathematicae )

November 2008

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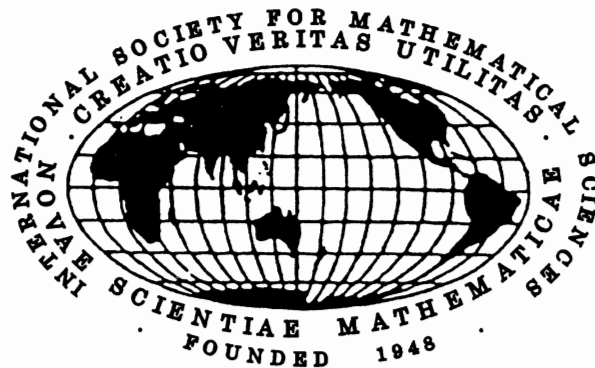
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SCMJ is the 21<sup>st</sup> Century New Unified Series of **Mathematica Japonica (MJ)** and **Scientiae Mathematicae (SCM)**. **MJ** was first published in 1948 and was one of the oldest mathematical journals in Japan. **SCM** was an online and print journal started in 1998 in celebration of the semi-centennial anniversary and received 26000 visits per month from 50 countries in the world. **SCMJ** contains original papers in mathematical sciences submitted from all over the world and receives **38000** visits per month now. Not only papers in pure and applied mathematics but those devoted to mathematical statistics, operations research, informatics, computer science, biomathematics, mathematical economics and other mathematical sciences are also welcome. The journal is published in January, March, May, July, September, and November in each calendar year.

The ISMS has enhanced the journal, beginning from July 1995, by including excellent Research-Expository papers in the section "**International Plaza** for Mathematical Sciences" as well as original research papers. The section provides papers dealing with broad overviews of contemporary mathematical sciences, written by experts mainly at our invitation. Papers shedding lights on open problems or new directions or new breakthroughs for future research are especially welcome.

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## BOOK REVIEWS

Notices from the ISMS

November 2008, Pages 1 - 9

*Mathematics in Population Biology*, by Horst R. Thieme, Princeton Series in Theoretical and Computational Biology, Simon A. Levin, Series Editor, Princeton University Press, Princeton and Oxford, 2003, 543 + xx pp., ISBN 0-691-09291-5.

### Reviewed by Radu Precup

Biological growth laws and pattern formation represent a huge source of mathematical models able to give rational understanding of the complex living world. However the idea to use mathematics in order to explain biological processes is quite new and has its own pioneers. Here are some basic moments of its development:

1798: MALTHUS, T.R., An essay on the principle of population, J Johnson in St Paul's Churchyard, London.

1838: VERHULST, P.F., Notice sur la loi que la population suit dans son accroissement, Corr. Math. Et Phys. 10, 113-121.

1845: VERHULST, P.F., Recherches mathématiques sur la loi d'accroissement de la population, Mem. Acad. Roy. Brussels, 18, 1-38.

1847: VERHULST, P.F., Recherches mathématiques sur la loi d'accroissement de la population, Mem. Acad. Roy. Brussels, 20.

1911: SHARPE, F.R. & LOTKA, A.J., A problem in age distribution, Phil. Magazine, 21, 435-438.

1922: LOTKA, A.J., The stability of the normal age distribution, Proc. Nat. Acad. Sci. 8, 339-345.

1923: LOTKA, A.J. & SHARPE, F.R., Contributions to the analysis of malaria epidemiology, Am. J. Hygiene 3, 1-21.

1925: LOTKA, A.J., Elements of physical biology, Williams & Wilkins, Baltimore.

1927: KERMACK, W.O. & McKENDRICK, A.G., A contribution to the mathematical theory of epidemics, Proc. Royal Soc. London 115, 700-721.

1932: KERMACK, W.O. & McKENDRICK, A.G., Contribution to the mathematical theory of epidemics, part. II, Proc. Royal Soc. London 138, 55-83.

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Communicated by Ioan A. Rus, Dept. of Applied Mathematics, Babes-Bolyai Univ., Romania

1933: KERMACK, W.O. & McKENDRICK, A.G., Contribution to the mathematical theory of epidemics, part. III, Proc. Royal Soc. London 141, 94-112.

1926: VOLTERRA, V., Variazioni e flettazioni del numero d'individui in specie animali conviventi, Mem. Acad. Sci. Lincei 2, 13-31.

1931: VOLTERRA, V., Leçons sur la théorie mathématique de la lutte pour la vie, Gauthier-Villars, Paris.

Many books in mathematical biology have been written in the last decade, such as

MURRAY, J.D., Mathematical biology, Springer, 1989.

BUSENBERG, S. & COOKE, K., Vertically transmitted diseases. Models and control, Springer, 1993.

DIEKMANN, O., DURRETT, R., HADELER, K.P., MAINI, P. & SMITH, H.L., Mathematics inspired by biology, Springer, 1999.

DIEKMANN, O. & HEESTERBEEK, J.A.P., Mathematical epidemiology of infectious diseases; model building, analysis and interpretation, Wiley, 2000.

ANITA, S., Analysis and control of age-dependent population dynamics, Kluwer, 2000.

BRAUER, F. & CASTILLO-CHAVEZ, C., Mathematical models in population biology and epidemiology, Springer, 2001.

RASS, L. & RADCLIFFE, J., Spatial deterministic epidemics, AMS, 2003.

BRITTON, N., Essential mathematical biology, Springer, 2003, to name just a few of them.

The Thieme's book is organized around some basic biological topics, going from concrete processes, through their mathematical modelling, to the analysis of the corresponding models, and back to the initial processes, with the qualitative conclusions and verification.

The book is organized on three parts and a fourth part of mathematical tools. Part I (Basic Population Growth Models) is mainly concerning with single-species population models. The contents of this part include: the fundamental balance equation of population dynamics, classic models of density-dependent population growth, discrete-time single species models, dynamics of an aquatic population interacting with a polluted environment and population growth under basic stage structure.

Part 2 (Stage Transitions and Demographics) is more fully devoted to the theme of stage transition. Here it is assumed that the stage transition (for example, from the juvenile stage to the adult one) depends on the time

an individual has already spent in the stage, and there are given answers to typical questions such as: how long does it take to go through a certain stage? How is the number of individuals in a stage and the number leaving the stage (stage output) related to the number of individuals entering the stage (stage input)? How does the average age in a population depend on the mortality? Although the models are not stochastic, the analysis in this part makes use of some probabilistic tools.

Part 3 (Host-Parasite Population Growth: Epidemiology of Infectious Diseases) is devoted to mathematical models in epidemiology and specific topics: epidemic threshold, disease-free and endemic equilibrium, extinction and persistence of the disease, optimal vaccination, endemic models with multiple groups of populations etc.

Compared to other books on dynamics of populations, most of them focussing on models of two species in competition, the main theme of the present book giving it unity and originality, is the theme of stage structure (age-structure, stages of infection etc.). Its treatment requires mathematical notions and tools of phase-plane analysis such as: equilibrium solutions, periodic orbits, homoclinic orbits, isoclines, Hopf bifurcation etc.

Without doubt, this is a very inspiring book, with a good balance between biological interpretation and mathematical results, a good introduction to the subject as well as a reference for applied mathematicians and researchers in biomathematics.

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• **B. Schweizer and A. Sklar**, *Probabilistic metric spaces*, Dover Publications, 2005, 313 pages, ISBN: 0486445143.

### Reviewed by Viorel Radu

1. In his seminal paper [1], *Karl Menger* introduced a natural probabilistic generalization of the notion of metric space: The distance numbers  $d(x, y)$  were replaced by distribution functions  $F_{xy}$ . Thus one thinks of the distance between points as being probabilistic, with  $F_{xy}(t)$  representing the probability that the distance between  $x$  and  $y$  is less than  $t$ . The Menger's paper constituted the starting point for a field of research known as *the theory of probabilistic metric spaces*.

It is worth recalling that Menger defined a statistical metric space<sup>1</sup> as a

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<sup>1</sup>The change in adjective from "statistical" to "probabilistic" was made in 1960 by Schweizer and Sklar [3].

set  $X$  together with an associated family of probability distribution functions  $F_{xy}$  satisfying the following triangle inequality

$$(M) \quad F_{xz}(t+s) \geq T(F_{xy}(t), F_{yz}(s))$$

for all  $x, y, z$  in  $X$  and all real numbers  $t, s$ . The functions  $T$ , used by Menger, were supposed to satisfy very weak conditions. *B. Schweizer and A. Sklar* introduced (cf. [2], [3]) some slightly stronger (algebraic) conditions on Menger norms and gave the definitive definition, a  $t$ -norm being a binary operation  $T$  on  $[0, 1]$  such that, for all  $a, b, c$  and  $d$  in  $[0, 1]$ , (a)  $T(a, 1) = a$ , (b)  $T(a, b) = T(b, a)$ , (c)  $T(a, b) \leq T(c, d)$ , whenever  $a \leq c$  and  $b \leq d$ , (d)  $T(T(a, b), c) = T(a, T(b, c))$ .

In 1964, *A. N. Šerstnev* [Kazan Gos. Univ. Ucen. Zap. 124, 3-11 (1964; Zbl 0178.52501)] passed from  $t$ -norms to triangle functions on the set  $\Delta^+$  of distance distribution functions:

$$(S) \quad F_{xz} \geq \tau(F_{xy}, F_{yz}).$$

This was a new step in the development of the theory of probabilistic metric spaces.

**2.** The book under review begins with a very striking introductory Chapter 1 devoted to historical aspects.

Chapters 2 through 7 develop the most important mathematical tools which are needed for the study of probabilistic metric spaces. We remark the study of the modified Levy metric  $d_L$  on the space of distance distribution functions (Sections 4.2-4.4). In Chapter 5, Associativity, a detailed study of the (continuous) triangular norms and co-norms is contained, including their structure and representations. A special chapter is devoted to the fundamental notion of copula, with interesting applications to measures of (in)dependence (see also Notes/pp.284-288). Chapter 7 contains a first book-form presentation of triangle functions, including a general method of construction, by means of  $t$ -norms together with some special operations on nonnegative reals. We notice that subsequent contributions are due to *T. Riedel* (cf. Notes/pp. 288-291)

The study of probabilistic metric spaces properly begins with Chapter 8 and goes through to Chapter 15. Chapter 8 contains the basic definitions. In Section 8.2, completed in Notes/291-293, some concrete formulas of metric-like functions are presented. Chapters 9-11 together with Notes/pp. 293-297 are devoted to special classes of probabilistic spaces: random metric spaces, distribution-generated spaces, and transformation-generated spaces. Chapters 12-13 contain fundamental results on strong topology and strong

uniformity ( including the uniform continuity of the probabilistic distance and the completion of a PM-space), finite and countable products, probabilistic (Pompeiu-)Hausdorff distances, discernibility and distinguishability relations and an introduction to fixed point theory in Menger spaces. Chapter 14 is devoted to betweenness. The final chapter is concerned with related structures: probabilistic normed spaces ( In Notes/pp. 300-302, the more comprehensive definition of probabilistic normed spaces, due to the authors and Alsina, is especially emphasized), inner-product spaces, probabilistic topologies and information spaces.

**3.** The Dover Edition 2005 contains the appendix *Notes*, pages 281-304, actually tailored to the content of the book, presenting some (more or less) recent developments as well as minor corrections to some errors in the first edition. The extensive bibliographical list of the first edition is now completed with *Supplementary References*, on pages 305-313.

**4.** Virtually any randomly selected section contains something very interesting. The book not only introduces the reader to the theory of probabilistic metric spaces but also whets the appetite to search out other publications in the domain. This is a volume that should be in every college and university library, being very suitable as a text for a course on selected topics in applied probability. Moreover, students should be actively encouraged to browse through this indispensable collection of notions, results, historical comments and open problems. The monograph is also useful to researchers who are interested in the field of probabilistic and fuzzy metric spaces.

**5. Final Remark.** The books and monographs (O. Onicescu, 1964), (V. Istrăţescu, 1974), (GH. Constantin & I. Istrăţescu, 1981 and 1989), (O. Hadžić, 1984 and 1995), (V. Radu, 1994), (E. P. Klement, R. Mesiar & E. Pap, 2000), (O. Hadžić & E. Pap, 2001) as well as (Chang, Cho & Kang, 2001), provide excellent starting points and very helpful resources for topics along the lines of analysis and operator theory on PM-spaces.

## References

- [1] K. Menger, Proc. Nat. Acad. Sci. U.S.A. 28 (1942), 535–537.
- [2] B. Schweizer, A. Sklar, Espaces métriques aléatoires, C. R. Acad. Sci. Paris 247 (1958), 2092-2094.
- [3] B. Schweizer and A. Sklar Statistical metric spaces, Pacific J. Math. 10 (1960), 313–334.

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*Leray-Schauder Type Alternatives, Complementarity Problems and Variational Inequalities*, by George Isac, Springer New-York, 2006, xiv + 338 pp., ISBN 0-387-32898-X.

### Reviewed by Adrian Petrușel

Complementarity theory represents one of the most dynamic new domain in applied mathematics, with profound roots in the field of pure mathematics and having important applications in optimization, mathematical economics and mathematical engineering.

On the other hand, the theory of variational inequalities has had a prolific development in the last thirty years, especially in connection to some mathematical models from economy.

Both topics, important from the theoretical and practical point of view, contain many important results in the last decades. It's enough to mention that there are several books and proceedings (some of them are mentioned below) and over 1500 articles dedicated to these subjects:

- Facchinei, Francisco; Pang, Jong-Shi: Finite-dimensional variational inequalities and complementarity problems, Vol. II. Springer Series in Operations Research. Springer-Verlag, New York, 2003. pp. i-xxxiv, 625–1234 and III–II57. ISBN: 0-387-95581-X

- Facchinei, Francisco; Pang, Jong-Shi: Finite-dimensional variational inequalities and complementarity problems. Vol. I. Springer Series in Operations Research. Springer-Verlag, New York, 2003. xxxiv+624+I69 pp. ISBN: 0-387-95580-1.

- Isac, G.; Bulavsky, V. A.; Kalashnikov, V. V.: Complementarity, equilibrium, efficiency and economics. Nonconvex Optimization and its Applications, 63. Kluwer Academic Publishers, Dordrecht, 2002. xviii+445 pp. ISBN: 1-4020-0688-8.

- Complementarity: applications, algorithms and extensions. Papers from the International Conference on Complementarity (ICCP99) held in Madison, WI, June 9–12, 1999. Edited by Michael C. Ferris, Olvi L. Mangasarian and Jong-Shi Pang. Applied Optimization, 50. Kluwer Academic Publishers, Dordrecht, 2001. viii+400 pp. ISBN: 0-7923-6816-9 90-06.

- Isac, George: Topological methods in complementarity theory. Nonconvex Optimization and its Applications, 41. Kluwer Academic Publishers, Dordrecht, 2000. xiv+683 pp. ISBN: 0-7923-6274-8.

- Topkis, Donald M.: Supermodularity and complementarity. *Frontiers of Economic Research*. Princeton University Press, Princeton, NJ, 1998. xii+272 pp. ISBN: 0-691-03244-0.

- Complementarity and variational problems. State of the art. Papers from the International Conference on Complementarity Problems held at Johns Hopkins University, Baltimore, MD, November 1-4, 1995. Edited by Michael C. Ferris and Jong-Shi Pang. *Society for Industrial and Applied Mathematics (SIAM)*, Philadelphia, PA, 1997. xii+473 pp. ISBN: 0-89871-391-9.

- Isac, George: Complementarity problems. *Lecture Notes in Mathematics*, 1528. Springer-Verlag, Berlin, 1992. vi+297 pp. ISBN: 3-540-56251-6.

- Cottle, Richard W.; Pang, Jong-Shi; Stone, Richard E.: The linear complementarity problem. *Computer Science and Scientific Computing*. Academic Press, Inc., Boston, MA, 1992. xxiv+762 pp. ISBN: 0-12-192350-9.

- Kojima, M.; Megiddo, N.; Noma, T.; Yoshise, A.: A unified approach to interior point algorithms for linear complementarity problems. *Lecture Notes in Computer Science*, 538. Springer-Verlag, Berlin, 1991. viii+108 pp. ISBN: 3-540-54509-3.

- Murty, K. G.: Linear complementarity, linear and nonlinear programming. *Sigma Series in Applied Mathematics*, 3. Heldermann Verlag, Berlin, 1988. xlviii+629 pp. ISBN: 3-88538-403-5.

The most important novelty of this book is the fact that the author tackles the complementarity theory and the theory of variational inequalities by the so-called Leray-Schauder alternatives. As the author also mentions, this work could be an open gate for new results and developments in the fields of complementarity theory and the theory of variational inequalities.

The main text is self-contained, the necessary background material being collected in the first chapter of the book.

The book is organized in eight chapters, each of them containing several paragraphs, forty-three on the whole.

**Chapter 1 ("Preliminaries", 47 pages)** includes basic notions and results systematically used in the book.

**Chapter 2 ("Complementarity Problems and Variational Inequalities", 22 pages)** defines the problems which are the object of the study: complementarity theory and the theory of variational inequalities.

**Chapter 3 ("Leray-Schauder Alternatives", 37 pages)** presents several Leray-Schauder type alternatives (by topological degree, by fixed

point method, by transversality theory, implicit Leray-Schauder alternative, etc.) for single-valued and multi-valued operators.

**Chapter 4 ("The Origin of the Notion of Exceptional Family of Elements", 28 pages)** presents the notion of exceptional family of elements associated to an operator and to a closed convex set, concept introduced by the author in 1997. The notion, initially defined in  $\mathbb{R}^n$  by means of the topological degree, will be extended, in chapter 5, by using the Leray-Schauder alternatives. The connections with the nonlinear complementarity problems are also shown. Roughly speaking, for a continuous operator  $f$  there exists either a solution for the nonlinear complementarity problem or an exceptional family of elements for  $f$ .

**Chapter 5 ("Leray-Schauder type alternatives. Existence theorems", 87 pages )** presents, using the relation between the notion of exceptional family of elements and the Leray-Schauder principle, existence results for several classes of complementarity problems.

**Chapter 6 ("Infinitesimal exceptional family of elements", 22 pages)** recall the definition of a infinitesimal exceptional family of elements, as well as, the connection with the notion of scalar derivatives and presents several existence results in complementarity theory.

**Chapter 7 ("More about the Notion of Exceptional Family of Elements", 32 pages)** is dedicated to the definition and the study of the concept of exceptional family of elements for more general classes of operators without the use of a Leray-Schauder alternative. Necessary and sufficient conditions for the non-existence of an exceptional family of elements are also given.

**Chapter 8 ("Exceptional Family of Elements and Variational Inequalities", 34 pages)** the concept of exceptional family of elements is extended and used in the study of variational problems. Explicit and implicit Leray-Schauder alternatives are here involved.

**The Bibliography** contains more than 200 titles, most of them very recent ones.

**An Index of Terms** is finally included.

From the above considerations, it is more than obviously that this book represents an important contribution in the field of applied mathematics. New and interesting results and applications can be found all over the book. The style is alert and pleasant. The technical presentation of the book is very good.

The book **Leray-Schauder Type Alternatives, Complementarity**

**Problems and Variational Inequalities** by George Isac, which appeared in the series "Nonconvex Optimization and its Applications", is an inspired publication of Springer Science+Business Media and I am sure that it will be a very useful work for researchers and advanced graduate students working in complementarity theory and the theory of variational inequalities, in particular and applied nonlinear analysis in general.

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## Communications :

### ( I ) Conferences for Young Algebraists

Klaus Denecke

The following list gives some information on the future conferences of young algebraists:

1. CYA (77. AAA), Potsdam, February 2009  
(dedicated to K. Denecke)
2. AAA Bern (Switzerland), June 11-14, 2009
3. CYA (79. AAA), Olomouc (Czech Republic), February 2010

See also pages 10 and 11 of Notices from the ISMS, January 2007.

### (II) Call for Proposals and Organizers for Special Sessions in IVMS 2008 and IVMS 2009

See also pages 18 to 20 of Notices from the ISMS, March 2008.

## The ISMS:

### ( I ) International Society for Mathematical Sciences ----- Contributions

In September 2007, we establish the following two funds.

(1) **International ISMS Prizes Fund**

in order to award the prizes for the original papers or survey works published in *Scientiae Mathematicae Japonicae* or *Notices from the ISMS*.

(2) **International Research Promoting Fund**

in order to promote and support international joint meetings by IVMS.

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The donation are used (1) to make medals for the new prizes (Kitagawa Prize, Kunugi Prize, and ISMS Prize), (2) to support the IVMS at Osaka University Nakanoshima Center, and (3) for a special fund designated by the contributors.

We deeply appreciate your generous contributions to support the above activities of our society. Your remittance to the following accounts of ours will be much appreciated.

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## Call for Papers for SCMJ :

### ( I ) Call for Papers for SCMJ

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#### (A) Submission

Authors are requested to choose one of the editors in the SCMJ editors list and send their papers, satisfying all of the following conditions, **directly to the editor**. The editors list can be obtained from (i) URL:<http://www.jams.or.jp/> (ii) " Editorial Board" of SCMJ(Vol.64, No.1, July 2006).

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- **To the editor's postal address**; **Two** hard copies of your paper, **two** hard copies of the Form for Submission (with the abstract)
- **To the e-mail address of ISMS** ([http://www.jams.or.jp/hp/submission\\_f.html](http://www.jams.or.jp/hp/submission_f.html)); Form for Submission (with the abstract)
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concerning transfer of risk and papers on maximal monotone multifunctions (with respect to duality) on Banach spaces

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$L^1$ -algebras. Group and semigroup compactifications of groups (Bohr periodic, almost periodic, weakly almost periodic). Totally bounded groups: pseudocompact groups, totally bounded groups, countably compact groups.

22A05, 22A10, 22A20, 22Bxx, 22C05, 22Dxx, 43A05, 43A07, 43A22, 43A25, 43A30, 43A35, 43A46, 43A60, 54H11

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(c) Lattice-valued topology, General topology (in particular, insertion and extension of functions), Pointfree topology

(d) 54A40, 54D15, 06D22

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(d) 22Axx, 54A25, 54H11, 54G11

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(d) Measure and integration, Vector measures, Non-additive measure theory, Topological linear spaces and related structures

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- (d) 46L, 47L
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Payment can be made through (1) a post office, (2) a bank, (3) by credit card, or (4) UNESCO Coupons.

Authors or members may choose the most convenient way of remittance as are shown below. Please note that **we do not accept payment by bank drafts (checks)**.

(1) Remittance through a post office to our giro account No. 00930-1-11872 or send International Postal Money Order to our postal address (2) Remittance through a bank to our account No. 94103518 at Shinsaibashi Branch of CITIBANK (3) **Payment by credit cards** (AMEX, VISA, MASTER or NICOS), or (4) Payment by UNESCO Coupons.

#### Methods of Domestic Payment:

Make remittance

(1) to our Post Office Transfer Account - 00930-3-73982 or

(2) to our account No.1565679 at SUMITOMO BANK, Sakai, Osaka, Japan.

All the correspondences concerning subscriptions, back numbers, individual and institutional memberships, should be addressed to the Publications Department, International Society for Mathematical Sciences.

## Membership Application Form ( from 2008 January )

To determine what membership category you are eligible for, read "Join ISMS" on the inside of the back cover.

1. Name: Family Name, First Name, Middle Name (in this order)
2. Home Address
3. Name of Firm or Institution affiliation
4. Postal address to which correspondence should be sent
5. e-mail address
6. Telephone Number, Fax Number
7. Membership Category
8. Panel (Please choose one out of the following 14panels in the page 26 and write the panel number. You could choose one or more.)
9. Would you like to buy the printed copies of SCMJ, whose prices a year are US\$60(6,000yen) for 1-year-members(A1, D1, S-A1, S-D1)and US\$55(5,500yen) for 4-year-members(A4, D4, S-A4, S-D4) ? Type YES or NO.
10. If you apply for an aged member (70 years old or over), please type the year of your birth.
11. If you wish to be a student member, please verify.
12. Is your university (institution) an Academic or Institutional Member of the ISMS? Yes or No.
13. If the answer of 12 is Yes, please answer the following. Are you designated associate member by your university (institution)?
14. Date
15. Signature

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I wish to enroll as a member of ISMS and will pay to International Society for Mathematical Sciences the annual dues upon presentation of an invoice. Copies of Mathematica Japonica, Scientiae Mathematicae and Scientiae Mathematicae Japonicae received as an ISMS member will be for my personal use and shall not be placed in institutional, university or other libraries or organizations, nor can membership subscriptions be used for library purposes.

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**ISMS Publications:** We published *Mathematica Japonica* (M.J.), which enjoyed an international reputation, for about sixty years in print and its offshoot *Scientiae Mathematicae* (SCM) both online and in print. In January 2001, the two publications were unified and changed to *Scientiae Mathematicae Japonicae* (SCMJ), which is the “21<sup>st</sup> Century New Unified Series of *Mathematica Japonica* and *Scientiae Mathematicae*” and published both online and in print. Ahead of this, the online version of SCMJ was first published in September 2000. The number of the annual total pages of the print version has been from 900 to 1,200 pages in six issues since January 1978. The whole number of SCMJ exceeds 240, which is the largest amount in the publications of mathematical sciences in Japan. The features of SCMJ are:

- 1) About 90 eminent professors and researchers of not only Japan but also 20 foreign countries join the Editorial Board. The submitted papers are received directly by the editors and are refereed quickly. The accepted papers are published online with no lead time after compiling or proofreading. SCMJ is reviewed by *Mathematical Review* and *Zentralblatt* from cover to cover.
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**Privileges to Institutional Members:** (1) Two associate members can be registered, free of charge, from an institution. (2) The discounted page charges (Table 2) are applied to the associate members.

**Table 1: Subscription Price (from 2007)**

	Individual 1-year mem.	Individual 3-year mem.	Institutional member	List Price
Print / year	¥6,000 US\$60, €48	¥5,500 * US\$55, €44	¥33,000 US\$300, €240	¥45,000 US\$400, €320
Online/year	Free	Free	—	—
Online+Print / year	¥6,000 US\$60, €48	¥5,500 * US\$55, €44	¥33,000 US\$300, €240	¥45,000 US\$400, €320

Postal charge is US\$2 (€1.6) per issue. \*In case three-year members make the payment at a time in advance, the price for 3 years is ¥15,000 (US\$150, €120). The authors can buy a copy of the print version at a price of ¥1,200 (US\$12) per issue including postage.

**Table 2: Publication charge for accepted papers**

The charge system for accepted papers has been changed and the basic publication charge has been introduced to reduce the total publication charge. The publication charge consists of ①the **basic publication charge** (¥1,000(US\$10, €7) and ②the **page charge**. The page charges per printed page are drastically reduced as follows.

	ISMS members	Non-members
p	¥ 3,500 ( US\$35, € 23 )	¥ 4,000 ( US\$40, €27 )
Tex	¥ 2,000 ( US\$20, € 14 )	¥ 2,500 ( US\$25, €17 )
LateX2e, LaTeX	¥ 700 ( US\$ 7, € 4 )	¥ 1,000 ( US\$10, € 7 )
Js ( ISMS style file )	¥ 500 ( US\$ 5, € 3 )	¥ 800 ( US\$ 8, € 5 )

**Table 3: Membership Dues for this year**

Categories	Domestic	Overseas	Developing countries
1-year member (1A)	A1: ¥9,000	F1: US\$75, €60	D1: US\$45, €36
3-year member (3A)	A3: ¥24,000	F3: US\$200, €160	D3: US\$117, €93
1-year students or aged (1S)	SA1: ¥5,000	SF1: US\$40, €32	SD1: US\$27, €21
3-year students or aged (3S)	SA3: ¥12,000	SF3: US\$100, €80	SD3: US\$71, €57
Life member* (L)	AL: ¥90,000	FL: US\$740, €592	DL: US\$616, €493

\*The members who have been the ISMS members for more than 10 years are eligible for this category. The categories 1S and 3S are for students or persons over 70 years old.