Communications in Mathematical Physics

Volume 157 1993

Chief Editor A. Jaffe, Cambridge, MA

Editorial Board
H. Araki, Kyoto
D. Brydges, Charlottesville, VA
A. Connes, Bures-sur-Yvette
R. Dijkgraaf, Amsterdam
J.-P. Eckmann, Genève
G. Felder, Zürich
M. E. Fisher, College Park, MD
M. Herman, Palaiseau
M. Jimbo, Kyoto
J. L. Lebowitz, New Brunswick, NJ
B. Simon, Pasadena, CA
Ya. G. Sinai, Princeton, NJ
T. Spencer, Princeton, NJ
S.-T. Yau, Cambridge, MA

Advisory Board
M. F. Atiyah, Oxford
L. Faddeev, St. Petersburg
F. Hirzebruch, Bonn
R. Schrieffer, Santa Barbara, CA
I. Singer, Cambridge, MA
C. N. Yang, Stony Brook, NY

Springer International

Copyright
Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.
All articles published in this journal are protected by copyright, wich covers the exclusive rights to reproduce and distribute the article (e. g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.
The use of general descriptive names, trade names, trademarks, etc., in this publikation, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.
While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Special regulations for photocopies in the USA:
Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0010-3616, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Springer-Verlag Berlin Heidelberg New York Tokyo Hong Kong Barcelona Budapest
Printers: Brühlsche Universitätsdruckerei, Giessen
Printed in Germany – © Springer-Verlag Berlin Heidelberg 1993
Springer-Verlag GmbH & Co KG, D-14197 Berlin, Germany

Contents

Aizenman, M., Molchanov, S.: Localization at Large Disorder and at Extreme Energies: An Elementary Derivation 245

Ben-Av, R. → Nabutovsky, A. 93
Brzeziński, T., Majid, S.: Quantum Group Gauge Theory on Quantum Spaces 591

Caliceti, E., Grecchi, V., Maioli, M.: Stark Resonances: Asymptotics and Distributional Borel Sum 347
Cecotti, S., Vafa, C.: Ising Model and N = 2 Supersymmetric Theories 139
Cibils, C.: A Quiver Quantum Group 459

Davies, E. B., Lindsay, J. M.: Superderivations and Symmetric Markov Semigroups 359
De Concini, C., Kac, V. G., Procesi, C.: Some Remarkable Degenerations of Quantum Groups 405

Flohr, M.: $\mathcal{W}$-Algebras, New Rational Models and Completeness of the $c = 1$ Classification 179
Frappat, L., Ragoucy, E., Sorba, P.: W-Algebras and Superalgebras from Constrained WZW Models: A Group Theoretical Classification 499

Gandolfi, A., Newman, C. M., Stein, D. L.: Exotic States in Long-Range Spin Glasses 371
Gordon, Y. A., Jaksić, V., Molčanov, S., Simon, B.: Spectral Properties of Random Schrödinger Operators with Unbounded Potentials 23
Graczyk, J., Świątek, G.: Singular Measures in Circle Dynamics 213
Grecchi, V. → Caliceti, E. 347
Greenleaf, A., Uhlmann, G.: Recovering Singularities of a Potential from Singularities of Scattering Data 549
Grégoire, P., Henneaux, M.: Hamiltonian BRST-anti-BRST Theory 279

Hayashi, T.: Quantum Group Symmetry of Partition Functions of IRF Models and its Application to Jones' Index Theory 331
Henneaux, M. → Grégoire, P. 279
Hollowood, T., Miramontes, J. L.: Tau-Functions and Generalized Integrable Hierarchies 99

Jakšić, V. → Gordon, Y. A. 23

Kac, V. G. → De Concini, C. 405
Kac, V., Radul, A.: Quasifinite Highest Weight Modules over the Lie Algebra of Differential Operators on the Circle 429
Kato, A., Quano, Y.-H., Shiraishi, J.: Free Boson Representation of q-Vertex Operators and their Correlation Functions 119

Lindsay, J. M. → Davies, E. B. 359
Lu, J. H.: Moment Maps at the Quantum Level 389

Maiolo, M. → Caliceti, E. 347
Majid, S. → Brzeziński, T. 591
Martinez-Moras, F., Ramos, E.: Higher Dimensional Classical W-Algebras 573
Matsuo, A.: Quantum Algebra Structure of Certain Jackson Integrals 479
Miramontes, J. L. → Hollowood, T. 99
Molčanov, S. → Gordon, Y. A. 23
Molchanov, S. → Aizenman, M. 245

Nabutovsky, A., Ben-Av, R.: Noncomputability Arising in Dynamical Triangulation Model of Four-Dimensional Quantum Gravity 93
Newman, C. M. → Gandolfi, A. 371

Oevel, W., Strampp, W.: Constrained KP Hierarchy and Bi-Hamiltonian Structures 51

Procesi, C. → de Concini, C. 405

Quano, Y.-H. → Kato, A. 119

Radul, A. → Kac, V. 429
Ragoucy, E. → Frappat, L. 499
Ramos, E. → Martinez-Moras, F. 573

Schupp, P., Watts, P., Zumino, B.: Bicovariant Quantum Algebras and Quantum Lie Algebras 305
Shiraishi, J. → Kato, A. 119
Simon, B. → Gordon, Y. A. 23
Sorba, P. → Frappat, L. 499
Sorella, S. P.: Algebraic Characterization of the Wess-Zumino Consistency Conditions in Gauge Theories 231
Stein, D. L. → Gandolfi, A. 371
Strampp, W. → Oevel, W. 51
Świątek, G. → Graczyk, J. 213

Uhlmann, G. → Greenleaf, A. 549

Vafa, C. → Cecotti, S. 139

Watts, P. → Schupp, P. 305
Wiesbrock, H. W.: Half-Sided Modular Inclusions of von-Neumann-Algebras 83

Zhang, B.: Convergence of the Godunov Scheme for a Simplified One-Dimensional Hydrodynamic Model for Semiconductor Devices 1
Zumino, B. → Schupp, P. 305

Indexed in *Current Contents*
Evaluated and abstracted for *PHYS* on *STN*

A 20414 D

Communications in Mathematical Physics

Volume 157 Number 3 1993

V. Kac, A. Radul — Quasifinite Highest Weight Modules over the Lie Algebra of Differential Operators on the Circle 429

C. Cibils — A Quiver Quantum Group 459

A. Matsuo — Quantum Algebra Structure of Certain Jackson Integrals 479

L. Frappat, E. Ragoucy, P. Sorba — *W*-Algebras and Superalgebras from Constrained WZW Models: A Group Theoretical Classification 499

A. Greenleaf, G. Uhlmann — Recovering Singularities of a Potential from Singularities of Scattering Data 549

F. Martinez-Moras, E. Ramos — Higher Dimensional Classical *W*-Algebras 573

T. Brzeziński, S. Majid — Quantum Group Gauge Theory on Quantum Spaces 591

Contents of Volume 157 I

Indexed in *Current Contents*
Evaluated and abstracted for *PHYS* on *STN*

CMPHAY 157 (3) 429–638
November (I) 1993
Printed on acid-free paper

Springer International

Springer LaTeX and plain-TeX macros

We can use your TeX files directly for phototypesetting if you have used our macros. Makropackages are available for the following journals:

LJour1 LaTeX styles for Acta Informatica, Applicable Algebra in Engineering, Communication and Computing, Archive for Mathematical Logic, Astronomy & Astrophysics Reviews, Calculus of Variations, Communications in Mathematical Physics, Continuum Mechanics and Thermodynamics, Economic Theory, Inventiones mathematicae, Journal of Evolutionary Economics, Journal of Mathematical Biology, Manuscripta mathematica, Mathematische Annalen, Mathematische Semesterberichte, Mathematische Zeitschrift, Numerische Mathematik, Probability Theory and Related Fields, Statistical papers, Theoretica Chimica Acta

PJour1g global plain TeX packages for all journals mentioned above; ***PJour 1*** may also still be used. All packages are available via mailserver, FTP server or on DOS diskettes.

Mailserver

Send an e-mail message to svserv@vax.ntp.springer.de
which must contain one (several) of the following commands:

LJour1 `get /tex/latex/ljour1.zip`
PJour1g `get /tex/plain/pjour1g.zip`

In order to be transmitted ungarbled via the net, the files are pkzipped and uunencoded. The line `get /tex/help-tex.txt` in your e-mail to svserv will send you a file explaining how to unpack the files you receive.
Please do not send regular e-mail to this address.

FTP server

The internet address is 192.129.24.12 (trick.ntp.springer.de) The username is FTP or ANONYMOUS and the files are in the directory /pub/tex

Diskettes

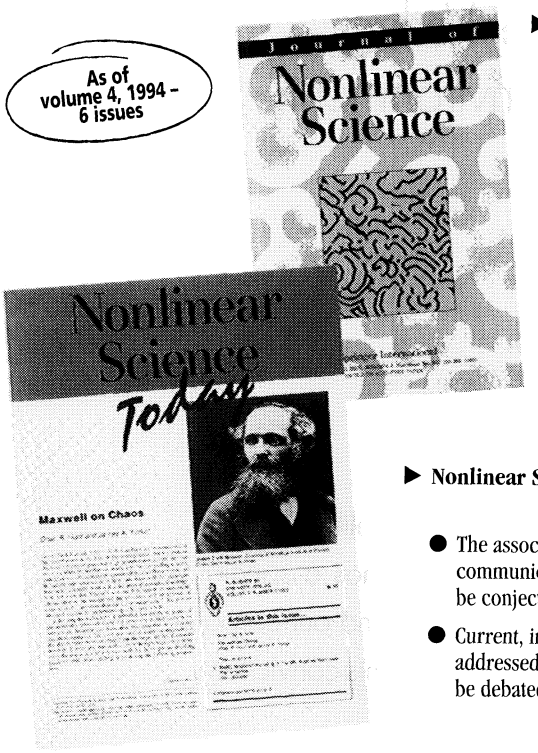
To get the macro files and the AMS fonts (when needed) on 3.5″ DOS diskettes please write to:

Springer-Verlag, Journal Production,
Tiergartenstr. 17
D-69121 Heidelberg, Germany
e-mail: springer@vax.ntp.springer.de
FAX number: x 49 6221 487625

Please indicate clearly which macro package you need and the journal for which your paper is intended.

Use our LaTeX and plain-TeX macros to prepare your article for this and for other Springer journals.

NOW - even more information per volume!



▶ Journal of Nonlinear Science

- Now in its third year, this journal publishes leading papers augmenting the fundamental ways we describe, model and predict nonlinear phenomena.
- Because of its unparalleled success, it will be expanding to bring you even more valuable information about research and developments in this highly active and dynamic field.

▶ Nonlinear Science Today

- The associated magazine is an informal organ of communication in which links between disciplines can be conjectured or even established.
- Current, interdisciplinary problems and methods can be addressed in a less technical fashion, controversies can be debated and professional news can be disseminated.

Managing Editors:
Eugeni A. Kuznetsov, Russian Academy of Sciences, Novosibirsk, Russia
Stephen R. Wiggins, California Institute of Technology, Pasadena, USA
In cooperation with an International Editorial Board

Springer

Tm.1117/MNTZ/E/1

ORDER FORM

❒ Please bill me

❒ Please charge my credit card
- ❒ Eurocard/Access/MasterCard
- ❒ American Express
- ❒ Visa/Barclaycard/BankAmericard
- ❒ Diners Club

Number

Valid until:

Please hand this order form to your bookseller or return to:
Springer-Verlag, Marketing Communication,
Postfach 10 52 80, D-69042 Heidelberg, FRG

Journal of Nonlinear Science
including **Nonlinear Science Today** ISSN 0938-8974 Title No. 332

❒ Please enter my subscription beginning with 1994: Volume 4 (6 issues) $ 283.00 (suggested list price) plus carriage charges: FRG $ 17.30; other countries $ 32.15

❒ Please send me a free sample copy

Name / Address

Date: Signature:

Please note: I realize that I may cancel this order within ten days by writing to the address on the order form, whereby the postmark date will suffice as proof that the cancellation was made within the deadline. I confirm my understanding of this with my second signature.

2nd Signature

All prices for books and journals include 7% VAT. In EC countries the local VAT is effective.

Springer-Verlag and the environment

We at Springer-Verlag firmly believe that an international science publisher has a special obligation to the environment, and our corporate policies consistently reflect this conviction.

We also expect our business partners – paper mills, printers, packaging manufacturers, etc. – to commit themselves to using environmentally friendly materials and production processes.

The paper in this journal is made from low- or no-chlorine pulp and is acid free, in conformance with international standards for paper permanency.