

## Special issue on Symmetries and Integrability of Difference Equations

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## CALL FOR PAPERS

## Special issue on Symmetries and Integrability of Difference Equations

This is a call for contributions to a special issue of *Journal of Physics A: Mathematical and General* entitled 'Special issue on Symmetries and Integrability of Difference Equations' as featured at the SIDE VII meeting held during July 2006 in Melbourne (<http://web.maths.unsw.edu.au/%7Eeschief/side/side.html>). Participants at that meeting, as well as other researchers working in the field of difference equations and discrete systems, are invited to submit a research paper to this issue.

This meeting was the seventh of a series of biennial meetings devoted to the study of integrable difference equations and related topics. The notion of integrability was first introduced in the 19th century in the context of classical mechanics with the definition of Liouville integrability for Hamiltonian flows. Since then, several notions of integrability have been introduced for partial and ordinary differential equations. Closely related to integrability theory is the symmetry analysis of nonlinear evolution equations. Symmetry analysis takes advantage of the Lie group structure of a given equation to study its properties. Together, integrability theory and symmetry analysis provide the main method by which nonlinear evolution equations can be solved explicitly. Difference equations, just as differential equations, are important in numerous fields of science and have a wide variety of applications in such areas as: mathematical physics, computer visualization, numerical analysis, mathematical biology, economics, combinatorics, quantum field theory, etc. It is thus crucial to develop tools to study and solve difference equations. While the theory of symmetry and integrability for differential equations is now well-established, this is not yet the case for discrete equations. The situation has undergone impressive development in recent years and has affected a broad range of fields, including the theory of special functions, quantum integrable systems, numerical analysis, cellular automata, representations of quantum groups, symmetries of difference equations, discrete (difference) geometry, etc. Consequently, the aim of the special issue is to benefit from the occasion offered by the SIDE VII meeting to provide a collection of papers which represent the state-of-the-art knowledge for studying integrability and symmetry properties of difference equations.

### Scope of the special issue

The special issue will feature papers which deal with themes that were covered by the SIDE VII Conference. These are

- Integrability testing
- Discrete geometry and visualization
- Laurent phenomena and cluster algebras
- Ultra-discrete systems
- Random matrix theory
- Algebraic-geometric approaches to integrability
- Yang–Baxter equations
- Quantum and classical integrable systems
- Difference Galois theory

### **Editorial policy**

- The subject of the paper should relate to the subject of the meeting. The Guest Editors will reserve the right to judge whether a contribution fits the scope of the topic of the special issue.
- Contributions will be refereed and processed according to the usual procedure of the journal.
- Conference papers may be based on already published work but should either
  - contain significant additional new results and/or insights or
  - give a survey of the present state of the art, a critical assessment of the present understanding of a topic, and a discussion of open problems.
- Papers submitted by non-participants should be original and contain substantial new results.

### **Guidelines for preparation of contributions**

- The deadline for contributed papers will be **15 January 2007**.
- There is a page limit of 16 printed pages (approximately 9600 words) per contribution. For submitted papers exceeding this length the Guest Editors reserve the right to request a reduction in length. Further advice on document preparation can be found at [www.iop.org/Journals/jphysa](http://www.iop.org/Journals/jphysa).
- Contributions to the special issue should if possible be submitted electronically by web upload at [www.iop.org/Journals/jphysa](http://www.iop.org/Journals/jphysa), or by email to [jphysa@iop.org](mailto:jphysa@iop.org), quoting 'J. Phys. A Special Issue: SIDE VII'. Submissions should ideally be in standard LaTeX form; we are, however, able to accept most formats including Microsoft Word. Please see the website for further information on electronic submissions.
- Authors unable to submit electronically may send hard-copy contributions to: Publishing Administrators, Journal of Physics A, Institute of Physics Publishing, Dirac House, Temple Back, Bristol BS1 6BE, UK, enclosing electronic code on floppy disk if available and quoting 'J. Phys. A Special Issue: SIDE VII'.
- All contributions should be accompanied by a read-me file or covering letter giving the postal and email address for correspondence. The Publishing Office should be notified of any subsequent change of address.

The special issue will be published in the paper and online version of the journal. The corresponding author of each contribution will receive a complimentary copy of the issue.

**Adam Doliwa, Risto Korhonen and Stephane Lafortune**  
**Guest Editors**