

## Introduction [Loops and quasigroups]

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## INTRODUCTION

This issue consists of papers that were presented to the international conference Loops'07 which was held on the campus of the Czech Agricultural University in Prague, 19 August – 25 August, 2007. The conference was preceded by Workshops Loops'07, 14 August – 18 August. The events were attended by sixty six mathematicians from twenty one countries, and by a dozen family members and partners. The conference continued the tradition started by Loops'99 and '03 with an aim to establish, every four years, a major forum open to all aspects of loop and quasigroup theory.

Quasigroups can be regarded as an algebraic expression of Latin squares, and hence it is natural that one of the main talks, by Brendan McKay, dealt with the recent progress in their enumeration. The title was *The numbers of Latin squares, quasigroups and loops*. A certain combinatorial flavor was present also in the talk of Jonathan I. Hall *Central automorphisms of Latin square designs and loops* who provided new insight into the connection of Moufang loops and groups with triality. Helmut Karzel spoke about one of his life-long research topics, explaining how to derive loops from geometries. His talk was called *Loops related to geometric structures*. Geometrical aspects were also present in the lecture *Gyrogroups, the special grouplike loops in the service of hyperbolic geometry and Einstein's special theory of relativity* by Abraham A. Ungar. The last two main lectures might be labelled as purely algebraic. One of them was the survey talk *Advances in loop rings and their loops* by Edgar G. Goodaire, and the other one presented recent results on *F*-quasigroups, as was the title of Tomáš Kepka's talk.

Since 2003 loop theory lost two influential figures who helped to shape its present form. We have remembered the life and work of both Lev Sabinin and Dan Robinson. The memorial lectures were given by Michael K. Kinyon and Edgar G. Goodaire. The latter was a close friend of Dan Robinson. In his talk he pointed out the bitterness of the fact that the death came just two weeks before Gábor P. Nagy found a proper finite simple Bol loop, the existence of which was one of the questions that dominated Robinson's research.

The contributed talks at the conference reported, in most cases, the recent research of the authors; many of these papers are presented in this issue. The limited extent of CMUC has forced us to move four papers (the last that were submitted) to the ensuing issue. To affiliate them to the conference, the names of the authors and the titles of their papers follow.

Aleš Drápal: *A class of commutative loops with metacyclic inner mapping groups*, Mike J. Grannell, Terry S. Griggs and Martin Knorr: *Embeddings of symmetric configurations and 3-homogeneous Latin trades*, Zdenka Kolar-Begović and Vladimir Volenc: *Affine regular decagons in GS quasigroups*, and Ružica

Kolar-Šuper and Vladimir Volenec: *Skewsquares in quadratical quasigroups*.

It should be mentioned that a special issue of the journal *Quasigroups and Related Systems* (volume 15, 2007) also accompanies the conference. The issue contains four papers that correspond to the main talks by E.G. Goodaire, J.I. Hall, K. Karzel and A.A. Ungar. Furthermore, the issue contains articles with material for four of the five courses given at the workshops. These are *Computing with small quasigroups and loops* by Gábor P. Nagy and Petr Vojtěchovský, *Connected transversals and multiplication groups of loops* by Markku Niemenmaa and Miikka Rytty, *Four lectures on quasigroup representations* by Jonathan D.H. Smith and *Transversals in latin squares* by I.M. Wanless. The fifth course, *Projective planes and loops* by Franz Kalhoff, is not reflected in the volume (the materials were distributed directly at the workshops).

The Program and Organizing Committee consisted of Orin Chein, Aleš Drápal (secretary), Alexandr Grishkov, Michael Kinyon, Alexander Kreuzer, Gábor P. Nagy, Markku Niemenmaa, Hala Pflugfelder (honorary chair), J.D. Phillips and Victor Shcherbacov.

The local organizers were headed by David Stanovský who maintained the web page together with Petr Vojtěchovský. Further organizers included Václav Flaška (visas), Štěpán Holub (social program), Jan Hora and Přemysl Jedlička (organizing at the spot), Tomáš Kepka (finances), Petr Němec (accommodation) and Jeroným Zvánovec (abstracts).

More information about the conference can be found at <http://www.karlin.mff.cuni.cz/~loops07/>.

This site contains, amongst other things, a complete list of participants, the schedule of the conference, the booklet of abstracts of talks, and a link to the website *Problems in Loop Theory and Quasigroup Theory*. (Most of them were proposed at the Loops conferences.)

We warmly thank the editorial board of *Commentationes Mathematicae Universitatis Carolinae* for making it possible to publish the proceedings of the conference in their journal. Special thanks go to Ivan Netuka (Editor-In-Chief), Jan Rataj (Executive Editor) and Anna Najmanová (Technical Editor).

Since the proceedings appear as a regular issue of the journal, they will be cited in a standard way. However, where they are cited as proceedings, the editorial credit should go to A. Drápal, M. Kinyon and J.D. Phillips (who are also the authors of this introduction).