Preface

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This issue of Journal of Applied Mathematics and Computing contains a collection of six papers that were presented at the 2010 *Conference on Algebraic and Geometric Combinatorics held at Kyeongju Korea*, in July 2010. These papers have been edited by the guest editorial board of the proceedings, consisting of Sejeong Bang, Mitsuugu Hirasaka, Hyunkwang Kim, Jack Koolen and Sung Y. Song incorporating with expert advice received from the reviewers including: David Bryant, Brian Curtin, Anton Deitmer, Nikolaos Diamantis, Steven Dougherty, Ivan Gutman, Masaaki Harada, Takashi Ichikawa, Antoaneta Klobucar, Jianxi Li, Akihiro Munemasa, Kazumasa Nomura, Vincent Pilaud, Christian Radoux, Aidan Roy, Seiken Saito, Alexander Schrijver, Jamie Simpson, Chris Storm, and Hajime Tanaka. We extend our thanks to the guest editors and reviewers who took part in the editorial process of the proceedings.

The topics of the collection cover diverse areas of mathematics such as number theory, finite geometry and combinatorics including codes, designs and graphs. These articles solve combinatorial problems by algebraic and/or geometric techniques, or solve number theory or geometry problems by using combinatorial techniques. They will provide a stimulus to the development of discrete mathematics, opening up unexpected new areas of application and construction technique. We briefly summarize the content of each article of the collection.

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1. MS#: JAMC-D-12-00070

Special values of multiple Hecke L-functions

Kentaro Ihara

(received on 3 November 2010; received in revised form on 10 October 2011; accepted by the guest editorial board on 30 November 2011).

This note is dealing with the links between the important theories of multiple Dirichlet series and multiple zeta values within Manin's non-commutative framework. It contains the idea of Manin for Mellin transform of non-commutative modular symbol. Its major contribution may be that there are explicit bounds for the dimensions.

2. MS#: JAMC-D-12-00071

Computational results of duadic double circulant codes

Sunghyu Han and Jon-Lark Kim

(received on 27 October 2010; received in revised form on 3 October 2011; accepted by the guest editorial board on 30 November 2011).

This paper gives an interesting construction of duadic double circulant codes and gives some interesting computational results of self-dual and formally self-dual codes providing a few record breaking codes.

3. MS#: JAMC-D-12-00072

Remarks on the concepts of t -designs

Eiichi Bannai and Etsuko Bannai

(received 5 November 2010; received in revised form on 30 July 2011; accepted by the guest editorial board on 31 August 2011).

This paper establishes a concept of t -designs for real hyperbolic spaces, shows connections with Euclidean t -designs and spherical t -designs with fixed base point. It also investigates an analogous concept (relative t -designs) for Q -polynomial association schemes. The notion of a relative design is defined by Ph. Delsarte and less well-known than that of an ordinary t -design. The authors show that two concepts are equivalent to a function theoretic formulation. This connection gives a new development in the study of relative t -designs, especially in Q -polynomial association schemes.

4. MS#: JAMC-D-12-00073

Edge zeta functions of hypergraphs

Iwao Sato

(received on 25 October 2010; received in revised form on 1 November 2011; accepted by the guest editorial board on 30 November 2011).

In this paper, the author defines an edge zeta function of a hypergraph by generalizing the Ihara-Selberg zeta function of a hypergraph. This brings together graph edge zeta functions, made popular by Stark and Terras, and hypergraph zeta functions, defined by C. Storm. The author also uses this generalization to give new determinant expressions for hypergraph zeta functions.

5. MS#: JAMC-D-12-00091

The size of 3-compatible, weakly compatible split systems

S. Grunewald, J. H. Koolen, V. Moulton, and T. Wu

(received on 5 September 2010; received in revised form on 2 November 2011; accepted by the guest editorial board on 30 November 2011.)

This article provides a new upper bound on the size of certain split systems by using purely combinatorial arguments. Given a finite set X , a split is a proper bipartition of the set X and a split system is a set of splits. The authors consider the split systems satisfying two compatibility conditions, and prove that if a collection of splits is weakly compatible, and if every subcollection of four splits contains two that are compatible, then the number of splits is linear in the size of the underlying set. In particular, they show that the cardinality of a 3-compatible, weakly compatible split system on X cannot exceed $7|X| - 28$. This work may well be an important stepping stone towards a more general bound.

6. MS#: JAMC-D-12-00093

Spin models constructed from Hadamard matrices

Takuya Ikuta and Akihiro Munemasa

(received on 1 November, 2010; received in revised form on 6 January 2011; accepted by the guest editorial board on 31 August 2011).

This paper gives new constructions of spin models from Hadamard matrices. In particular, authors give an answer to the long standing open problem concerning the existence of new spin models of index 2^k .

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Editors-in-Chief of JAMC