The 5th International Coding Theory Seminar (4th ICTS)

Philippines (online)

December 20, 2024

Contents

About **3**
Organizing committee 3
International advisors 3
Local organizing committee 3

Program **4**

Abstracts **5**
Low-Bandwidth Repair of Reed-Solomon Codes and Its Application to Secure Matrix Multiplication 5
Self-dual and self-orthogonal codes over non-unital rings of order p^2 where p is an odd prime 6
Symplectic Codes over a Non-Unitary Ring 7

About

Organizing committee

China
Xiwang Cao
Lingfei Jin (vice chair)
Hongwei Liu (chair)
Gaojun Luo

India
Manish Gupta (chair)
Sartaj Ul Hasan
Anuradha Sharma

Japan
(TBA)

Korea
Whan-Hyuk Choi
Boran Kim
Jon-Lark Kim (chair)

Philippines
Rowena Betty
Romar dela Cruz
Lucky Galvez (chair)

Thailand
Arunwan Boripan
Parinyawat Choosuwan
Somphong Jitman (chair)
Ekkasit Sangwisut

Singapore
Martianus Frederic Ezerman (chair)

International advisors

Nathan Kaplan (USA)
Patrick Sole (France)
Hong-Yeop Song (Korea)
Chaoping Xing (China)

Local organizing committee

Lucky Galvez (University of the Philiipines)
Romar dela Cruz (University of the Philiipines)

Program

All times listed are in Philippine Time (GMT+8).

Date: December 20, 2024

Time	Activities	
13:00–14:00	Committee Discussion	
14:00–14:45	**Stanislav Kruglik** School of Physical and Mathematical Sciences, Nanyang Technological University	Low-Bandwidth Repair of Reed-Solomon Codes and Its Application to Secure Matrix Multiplication
14:45–15:00	Discussion	
15:00–15:45	**Altaf Dakhel Zaid Al-Shuhail** Department of Mathematics, Faculty of Science, University of Hail	Self-dual and self-orthogonal codes over non-unital rings of order p^2 where p is an odd prime
15:45–16:00	Discussion	
16:00–16:10	Break	
16:10–16:55	**Rowena Alma L. Betty** Institute of Mathematics, University of the Philippines	Symplectic Codes over a Non-Unitary Ring
16:55–17:10	Discussion	

Abstracts

Low-Bandwidth Repair of Reed-Solomon Codes and Its Application to Secure Matrix Multiplication

Stanislav Kruglik

School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore

In this talk, I will introduce the Reed-Solomon repair problem and the innovative Guruswami-Wootters framework, which focuses on repairing erased symbols of Reed-Solomon codes for two matrices. I will then demonstrate how Reed-Solomon codes can facilitate secure multiplication of two matrices and how low-bandwidth techniques can reduce the communication cost of this operation.

Self-dual and self-orthogonal codes over non-unital rings of order p^2 where p is an odd prime

Altaf Dakhel Zaid Al-Shuhail

Department of Mathematics, Faculty of Science, University of Hail, Hail, Saudi Arabia

**to follow*

Symplectic Codes over a Non-Unitary Ring

Rowena Alma L. Betty

Institute of Mathematics, University of the Philippines

We consider the commutative non-unitary ring of order four defined as

$$I = \{a, b \mid 2a = 0, 2b = 0, a2 = b, ab = 0\}.$$

Self-dual codes for a symplectic inner product over I are introduced. A mass formula to enumerate them under symplectic equivalence is given. An application is a classification of such codes in short lengths.