2022 International Symposium on Information Theory and Its Applications (ISITA 2022)

Tsukuba, Ibaraki, Japan
17-19 October 2022

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Technical Program

Time	Main Convention Hall	Room 101	Room 102
Monday, October 17			
13:30-14:30	M-PT-Main: *Plenary Talk 1*		
14:50-15:50	M-SS-Main: *Symposium Session*		
Tuesday, October 18			
09:00-10:15		T-1-101: *Error-Correcting Codes*	T-1-102: *Sparsity*
10:30-12:10		T-2-101: *Capacity*	T-2-102: *Cryptography and Primitives*
12:10-12:40		T-PR-101: *Poster Review 1 A*	T-PR-102: *Poster Review 1 B*
13:50-15:05		T-3-101: *Codes for Storage*	T-3-102: *Algorithms*
15:20-16:20		T-PT-101+2: *Plenary Talk 2*	
16:35-18:15		T-4-101: *Constrained Codes*	T-4-102: *Communication*
Wednesday, October 19			
09:00-10:15		W-1-101: *Learning*	W-1-102: *Security and Coding*
10:30-12:10		W-2-101: *Coding Theory*	W-2-102: *Security and Information Theory*
12:10-12:40		W-PR-101: *Poster Review 2 A*	W-PR-102: *Poster Review 2 B*
14:00-14:30		*Award Ceremony*	
14:50-16:30		W-3-101: *Applications and Quantum*	W-3-102: *Privacy*
16:45-18:00		W-4-101: *Source Coding*	

Monday, October 17

Monday, October 17 13:30 - 14:30

M-PT-Main: Plenary Talk 1

My Journey to Explore Codes for Correcting Lee-Metric Errors on 2-D Lattices
Hiroyoshi Morita (The University of Electro-Communications, Japan)

Room: Main Convention Hall

Monday, October 17 14:50 - 15:50

M-SS-Main: Symposium Session

My First ISITA; history of 32 years of encouragement
Tomoharu Shibuya (Sophia University, Japan), Mitsuharu Arimura (Shonan Institute of Technology & Faculty of Engineering, Japan), Shigeaki Kuzuoka (Wakayama University, Japan)

Room: Main Convention Hall

Tuesday, October 18

Tuesday, October 18 9:00 - 10:15

T-1-101: Error-Correcting Codes

Room 101
Chair: Masanori Hirotomo (Saga University, Japan)

A Class of Cyclic Partial Geometries and Their Associated Constant Weight and LDPC Codes
Juane Li (University of California, Davis, USA); Yi Gong (Guangdong University of Technology, China); Xin Xiao (University of Arizona, USA); Shu Lin (University of California, Davis, USA); Khaled Abdel-Ghaffar (University of California, USA)
pp. 1-5

Bit-Level Informed Dynamic Scheduling for Decoding Non-binary LDPC Codes
Chia-Hao Lin and Tzu-Hsuan Huang (National Tsing Hua University, Taiwan); Chung-Hsuan Wang

(National Chiao Tung University, Taiwan); Yeong-Luh Ueng (National Tsing Hua University, Taiwan)
pp. 6-10

Some Girth-8 Linear Code is a 3-SEQ LRC
Zhi Jing, Hyojeong Choi and Hong-Yeop Song (Yonsei University, Korea (South))
pp. 11-13

T-1-102: Sparsity

Room 102
Chair: Kazushi Mimura (Hiroshima City University, Japan)

Ordinary Differential Equation-based Sparse Signal Recovery
Tadashi Wadayama and Ayano Nakai-Kasai (Nagoya Institute of Technology, Japan)
pp. 14-18

Sparse Signal Reconstruction with QUBO Formulation of l0-Regularized Linear Regression
Naoki Ide (Sony Corporation & R&D Center, Japan); Masayuki Ohzeki (Sigma-i Co., Ltd, Tohoku University, Tokyo Tech, Japan)
pp. 19-23

Theory of the optimum interpolation reconstruction and an application for Parallel MRI
Yuichi Kida (Ohu University, Japan); Takuro Kida (Tokyo Institute of Technology, Japan)
pp. 24-28

Tuesday, October 18 10:30 - 12:10

T-2-101: Capacity

Room 101
Chair: Mitsuharu Arimura (Shonan Institute of Technology & Faculty of Engineering, Japan)

A Tighter Lower Bound on the Capacity of the Cascading Binary Deletion Channel and Binary Symmetric Channel
Hassan Tavakoli (Guilan University, Iran); Saeid Pakravan (Laval University, Canada)
pp. 29-33

Channel Capacity with Cost Constraint Allowing Some Cost Overrun
Masaki Hori and Mikihiko Nishiara (Shinshu University, Japan)
pp. 34-38

On the Achievability of Interference Channel Coding
Jun Muramatsu (NTT Corporation, Japan)
pp. 39-43

On the Optimum Achievable Rates of a Coded Caching Scheme with Small Cache Memory
Akihito Nagaya and Hiroki Koga (University of Tsukuba, Japan)
pp. 44-48

T-2-102: Cryptography and Primitives

Room 102
Chair: Hidenori Kuwakado (Kansai University, Japan)

Revisiting Lattice-Based Attacks Using Trace Map for Ring-LWE
Shinya Okumura (Osaka University, Japan); Momonari Kudo and Shusaku Uemura (The University of Tokyo, Japan)
pp. 49-53

High-Density Knapsack Cryptosystem using Shifted-Odd and Super-Increasing Sequence
Minami Sato, Sousuke Minamoto, Ryuichi Sakai and Yasuyuki Murakami (Osaka Electro-Communication University, Japan)
pp. 54-58

Three-Pass Identification Scheme Based on MinRank Problem with Half Cheating Probability
Bagus Santoso (The University of Electro-Communications, Japan); Yasuhiko Ikematsu (Kyushu University, Japan); Shuhei Nakamura (Nihon University, Japan); Takanori Yasuda (Okayama University of Science, Japan)
pp. 59-63

Hash-Chain-Based Sanitizable Signatures for Deletion and Generalization Processes
Hikaru Tsuchida, Haruna Higo, Toshiyuki Isshiki and Kengo Mori (NEC Corporation, Japan)
pp. 64-68

Tuesday, October 18 12:10 - 12:40

T-PR-101: Poster Review 1 A

Room 101

Adaptively Decodable Visual Secret Sharing Scheme on Background Color
Masanori Hirotomo and Atsushi Marui (Saga University, Japan); Yoshiaki Shiraishi (Kobe University, Japan)

Consideration on the required number of quantization bits for SGRAND
Taro Kumamoto and Shogo Usami (Meijo University, Japan)

Reed-Muller Sequence-Based Block Orthogonal Sparse Superposition Codes
Hinako Nakanishi (Doshisha University, Japan); Guanghui Song (Xidian University, China); Tomotaka Kimura and Jun Cheng (Doshisha University, Japan)

On Timing for Applying the Updating Parameters of Sum-Product/BP Decoding
Takeru Miyazaki (Kyushu Institute of Information Sciences, Japan); Satoshi Uehara (The University of Kitakyushu, Japan); Junru Zheng (Kyushu Women's University, Japan)

T-PR-102: Poster Review 1 B

Room 102

Realization of ID-based Non-Interactive Key Sharing Scheme based on Discrete Logarithm Problem over Composite Number
Mizuki Miki and Yasuyuki Murakami (Osaka Electro-Communication University, Japan)

NIST Statistical Test for Public Keys of Representative Modular Knapsack Cryptosystems
Sousuke Minamoto, Hayato Inoue, Minami Sato and Yasuyuki Murakami (Osaka Electro-Communication University, Japan)

Security Information Retrieval Engine for Cyber Attack Analysis
Ayaka Soeda and Yoshiaki Shiraishi (Kobe University, Japan); Masami Mohri (Kindai University, Japan); Masakatu Morii (Kobe University, Japan)

CSciBERT: Computer Science-Domain Pretrained Language Model
Yusuke Tomita (Gifu University, Japan); Masami Mohri (Kindai University, Japan); Yoshiaki Shiraishi (Kobe University, Japan)

Re-learning Techniques for Continuous Operation of Automated Vulnerability Assessment System
Soohyun Jung and Yoshiaki Shiraishi (Kobe University, Japan); Takashi Ozu and Takashi Matsunaka (Advanced Telecommunications Research Institute International, Japan); Masami Mohri (Kindai University, Japan); Hiroki Kuzuno and Masakatu Morii (Kobe University, Japan)

Tuesday, October 18 13:50 - 15:05

T-3-101: Codes for Storage

Room 101
Chair: Akiko Manada (Nagaoka University of Technology, Japan)

Balanced coding with Lehmer code
Hiroshi Kamabe (Gifu University, Japan); Shan Lu (Nagoya University, Japan); Takumi Marumo (NTT Data Tokai Corporation, Japan)
pp. 69-73

High Areal Density Heated Dot Magnetic Recording Systems with Double-layered Bit Patterned Media
Hidetoshi Saito (Kogakuin University, Japan)
pp. 74-78

Codes for Constrained Periodicity
Adir Kobovich and Orian Leitersdorf (Technion - Israel Institute of Technology, Israel); Daniella Bar-Lev and Eitan Yaakobi (Technion, Israel)
pp. 79-83

T-3-102: Algorithms

Room 102
Chair: Hideki Yagi (University of Electro-Communications, Japan)

A numerical study of multi-letter Ahlswede-Han scheme for modulo-sum problem
Takuto Kakishima (University of Tsukuba, Japan); Shun Watanabe (Tokyo University of Agriculture and Technology, Japan)
pp. 84-88

An Algorithm for Computing the Stratonovich's Value of Information
Akira Kamatsuka (Shonan Institute of Technology, Japan); Takahiro Yoshida (Nihon University, Japan); Koki Kazama (Shonan Institute of Technology, Japan); Toshiyasu Matsushima (Waseda University, Japan)
pp. 89-93

Enumeration and Coding of Binary AIFV-m Code Trees
Genta Onishi, Kengo Hashimoto and Ken-ichi Iwata (University of Fukui, Japan); Hirosuke Yamamoto (The University of Tokyo, Japan)
pp. 94-98

Tuesday, October 18 15:20 - 16:20

T-PT-101+2: Plenary Talk 2

Some New Analytical Tools for Evaluation of Code Ensemble Performance
Neri Merhav (Technion, Israel)

Room 101, Room 102

Tuesday, October 18 16:35 - 18:15

T-4-101: Constrained Codes

Room 101
Chair: Hiroshi Kamabe (Gifu University, Japan)

Average Redundancy of Variable-Length Balancing Schemes à la Knuth
Tu Duc Dao and Han Mao Kiah (Nanyang Technological University, Singapore); Thanh Tuan Nguyen (Singapore University of Technology and Design, Singapore)
pp. 99-103

Reconstruction from Substrings with Partial Overlap
Yonatan Yehezkeally (Technical University of Munich, Germany); Daniella Bar-Lev (Technion, Israel); Sagi Marcovich (Technion - Israel Institute of Technology, Israel); Eitan Yaakobi (Technion, Israel)
pp. 104-108

A Necessary and Sufficient Condition for Reconstruction of Circular Binary String based on the Lengths of Substrings with Weights
Takahiro Ota (Senshu University, Japan); Akiko Manada (Nagaoka University of Technology, Japan)
pp. 109-113

The Maximum Run-Length Constrained Balanced Codes for Random-Access DNA Storage
Akiko Manada (Nagaoka University of Technology, Japan); Takahiro Ota (Senshu University, Japan); Hiroyoshi Morita (The University of Electro-Communications, Japan)
pp. 114-118

T-4-102: Communication

Room 102
Chair: Motohiko Isaka (Kwansei Gakuin University, Japan)

Finite Blocklength Analysis of Cooperative Superposition Coded Relaying Systems over Nakagami-m Fading Channels
Yohei Sakai and Masaya Kambara (Doshisha University, Japan); Guanghui Song (Xidian University, China); Tomotaka Kimura and Jun Cheng (Doshisha University, Japan)
pp. 119-123

PSOR-Jacobi Algorithm for Accelerated MMSE MIMO Detection
Asahi Mizukoshi, Tadashi Wadayama and Ayano Nakai-Kasai (Nagoya Institute of Technology, Japan)
pp. 124-128

Near-Optimal Designs of Hybrid Massive MIMO Systems from Lattice Decoding
Hsiao-feng Francis Lu (Taiwan)
pp. 129-133

New Inner and Outer Bounds for Gaussian Broadcast Channels with Heterogeneous

Blocklength Constraints
    Marcel A. Mross (TU Braunschweig, Germany); Pin-Hsun Lin and Eduard A Jorswieck (Technische Universität Braunschweig, Germany)
    pp. 134-138

Wednesday, October 19

Wednesday, October 19 9:00 - 10:15

W-1-101: Learning

Room 101
    Chair: Manabu Kobayashi (Waseda University, Japan)

Generalization Bounds for Deep Transfer Learning Using Majority Predictor Accuracy
    Cuong N Nguyen (Florida International University, USA); Lam Si Tung Ho (Dalhousie University, Canada); Vu Dinh (University of Delaware, USA); Tal Hassner (Meta AI, USA); Cuong V Nguyen (Florida International University, USA)
    pp. 139-143

Bayes Optimal Estimation and Its Approximation Algorithm for Difference with and without Treatment under URLC Model
    Taisuke Ishiwatari (Waseda University, Japan); Shota Saito (Gunma University, Japan); Yuta Nakahara, Yuji Iikubo and Toshiyasu Matsushima (Waseda University, Japan)
    pp. 144-148

Two-dimensional Autoregressive Model with Time-varying Parameters and the Bayes Codes
    Yuta Nakahara and Toshiyasu Matsushima (Waseda University, Japan)
    pp. 149-153

W-1-102: Security and Coding

Room 102
    Chair: Yasuyuki Murakami (Osaka Electro-Communication University, Japan)

A Group-Type Distributed Secure Coded Computation Scheme Based on a Secret Sharing
    Koki Kazama (Shonan Institute of Technology, Japan); Toshiyasu Matsushima (Waseda University, Japan)
    pp. 154-158

On the Optimal Construction of a Visual Cryptography Scheme for Multiple Secret Images
    Raiki Ioki and Hiroki Koga (University of Tsukuba, Japan)
    pp. 159-163

A Security Enhanced Data Transmission Scheme Using Sequences Generated by Non-Systematic Reed-Solomon Coding
    Shoichiro Yamasaki (Hiroshima City University, Japan); Tomoko Matsushima (Yokohama College of Commerce, Japan); Hirokazu Tanaka (Hiroshima City University, Japan)
    pp. 164-168

Wednesday, October 19 10:30 - 12:10

W-2-101: Coding Theory

Room 101
    Chair: Takayuki Nozaki (Yamaguchi University, Japan)

Improved Survival Probability for Coded Compressed Sensing in Unsourced Random Access
    Shan Lu (Nagoya University, Japan); Hiroshi Kamabe (Gifu University, Japan)
    pp. 169-173

A Group-Type Distributed Coded Computation Scheme Based on a Gabidulin Code
    Koki Kazama (Shonan Institute of Technology, Japan); Toshiyasu Matsushima (Waseda University, Japan)
    pp. 174-178

Construction of reversible integer codes with large moduli via Chinese remainder theorem
    Norifumi Ojiro (Toyota Technological Institute, Japan); Hajime Matsui (Kagoshima University, Japan)
    pp. 179-183

Hyperbolic Sets in Incomplete Tables

José Joaquín Bernal (University of Murcia, Spain); Juan Jacobo Simón (Universidad de Murcia, Spain)

W-2-102: Security and Information Theory

Room 102

Chair: Mitsugu Iwamoto (The University of Electro-Communications, Japan)

Unified expression of utility-privacy trade-off in privacy-constrained source coding
Naruki Shinohara (NTT DOCOMO, INC., Japan); Hideki Yagi (University of Electro-Communications, Japan)
pp. 184-188

A Framework for Distributed Source Coding with Encryption: a New Strong Converse and More
Yasutada Oohama (University of Electro-Communications, Japan); Bagus Santoso (The University of Electro-Communications, Japan)
pp. 189-193

Impact of Artificial Noise Assisted Transmission on the Physical Layer Security Performances in Wireless Wiretap Channel with Active Eavesdropper
Saeid Pakravan (Laval University, Canada); Ghosheh Abed Hodtani (Ferdowsi University of Mashhad, Mashhad, Iran)
pp. 194-198

The Relay Impact on the Physical Layer Security Performance of the Wireless Wiretap Channel
Saeid Pakravan (Laval University, Canada); Ghosheh Abed Hodtani (Ferdowsi University of Mashhad, Mashhad, Iran)
pp. 199-203

Wednesday, October 19 12:10 - 12:40

W-PR-101: Poster Review 2 A

Room 101

Geometric Representation and Optimum Weights of the BWSRM for Binary Mixed State Signals
Shogo Isokawa and Kengo Miyachi (Aichi Prefectural University, Japan); Tiancheng Wang (Kanagawa University, Japan); Souichi Takahira (Meijo University, Japan); Tsuyoshi Usuda (Aichi Prefectural University, Japan)

Towards the Construction of Quantum Error Correcting Codes for Multiple Insertion Errors
Yuma Adachi and Shogo Usami (Meijo University, Japan); Tsuyoshi Usuda (Aichi Prefectural University, Japan)

Effects of Coding for CPPM-type Quantum Cipher
Yuki Wakahara and Shogo Usami (Meijo University, Japan); Tsuyoshi Usuda (Aichi Prefectural University, Japan); Souichi Takahira (Meijo University, Japan)

Advance sharing of quantum shares for quantum secrets by EAQECC
Mamoru Shibata (National Institute of Technology, Tokyo College, Japan)

W-PR-102: Poster Review 2 B

Room 102

MQTT Communication and Data Capturing in Inventory Management Processes Based on Utilization of Drones and RFID technology
Pavel Stasa, Filip Benes and Jiri Svub (VSB - Technical University of Ostrava, Czech Republic); Jakub Unucka (Gaben, Czech Republic); Radoslav Nowak and Miroslav Bohac (GABEN, Czech Republic)

Development of Suitable RFID Reader for Using onto Unmanned Aerial Vehicles
Pavel Stasa, Filip Benes and Jiri Svub (VSB - Technical University of Ostrava, Czech Republic); Jakub Unucka (Gaben, Czech Republic); Radoslav Nowak (GABEN, Czech Republic); Pavel Benda (Gaben, Czech Republic)

Sparse Spatial Modulation Scheme Effective for Ultrafast Mobile Communications
Tatsumi Konishi and Naotaka Miyaji (Aichi Institute of Technology, Japan)

Enhancing Communication Services with Location and Sensing Information
Ehsan Moeen Taghavi (University of Oulu, Finland); Ramin Hashemi (Nokia, Finland); Premanandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Wednesday, October 19 14:00 - 14:30

Award Ceremony

Room 101

Wednesday, October 19 14:50 - 16:30

W-3-101: Applications and Quantum

Room 101
Chair: Tetsuya Kojima (National Institute of Technology, Tokyo College, Japan)

A Modified MWPM Decoding Algorithm for Quantum Surface Codes over Depolarizing Channels
Yaping Yuan and Chung-Chin Lu (National Tsing Hua University, Taiwan)
pp. 204-208

Influence of Reflected Light in Illumination-Light VN-CodeSK Based Positioning Systems
Yuta Ochiai, Daisuke Ogawa, Yusuke Kozawa and Hiromasa Habuchi (Ibaraki University, Japan)
pp. 209-213

Iterative Model Identification and Tracking with Distributed Sensors
Lei Jiang (Tokyo institute of technology, Japan); Zribi Amin (Higher Institute of Communication Technology, Tunisia & IMT Atlantique, France); Tad Matsumoto (Japan Advanced Institute of Science and Technology, France & IMT-Atlantic, Brest, France); Jun-ichi Takada (Tokyo Institute of Technology, Japan)
pp. 214-218

PSK-type asymmetric quantum communication and its attenuation characteristics
Suguru Sameshima (Meijo University, Japan); Tiancheng Wang (Kanagawa University, Japan); Shogo Usami (Meijo University, Japan); Tsuyoshi Usuda (Aichi Prefectural University, Japan)
pp. 219-223

W-3-102: Privacy

Room 102
Chair: Toyoo Takata (Iwate Prefectural University, Japan)

Behavioral Authentication Method Focusing on the Tendency of the Days of the Week
Reiya Okawa, Ryosuke Kobayashi and Rie Shigetomi Yamaguchi (The University of Tokyo, Japan)
pp. 224-228

An analysis of password security risk against dictionary attacks
Binh Le Thanh Thai and Hidema Tanaka (National Defense Academy, Japan)
pp. 229-233

An Improvement of Multi-Party Private Set Intersection Based on Oblivious Programmable PRFs
Seiya Shimizu (The University of Electro-Communications, Japan); Takeshi Nakai (Toyohashi University of Technology, Japan); Yohei Watanabe and Mitsugu Iwamoto (The University of Electro-Communications, Japan)
pp. 234-238

Card-based Cryptographic Protocols for Private Set Intersection
Anastasiia Doi and Tomoki Ono (The University of Electro-Communications, Japan); Takeshi Nakai (Toyohashi University of Technology, Japan); Kazumasa Shinagawa (Ibaraki University, Japan); Yohei Watanabe (The University of Electro-Communications, Japan); Koji Nuida (Kyushu University & National Institute of Advanced Industrial Science and Technology (AIST), Japan); Mitsugu Iwamoto (The University of Electro-Communications, Japan)
pp. 239-243

Wednesday, October 19 16:45 - 18:00

W-4-101: Source Coding

Room 101
Chair: Jun Muramatsu (NTT Corporation, Japan)

A Class of Data Compression Where The Codeword Is a Computer Program Generating The Data
Mitsuharu Arimura (Shonan Institute of Technology & Faculty of Engineering, Japan)
pp. 244-248