

**2022 58th Annual Allerton
Conference on Communication,
Control, and Computing
(Allerton 2022)**

**Monticello, Illinois, USA
27 – 30 September 2022**



IEEE Catalog Number: CFP2240F-POD
ISBN: 979-8-3503-9999-8

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

| | |
|-------------------------|-------------------|
| IEEE Catalog Number: | CFP2240F-POD |
| ISBN (Print-On-Demand): | 979-8-3503-9999-8 |
| ISBN (Online): | 979-8-3503-9998-1 |

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

| | |
|--|-----|
| Active Learning for Individual Data Via Minimal Stochastic Complexity | 1 |
| <i>Shachar Shayovitz, Meir Feder</i> | |
| Byzantine Resilience with Reputation Scores | 6 |
| <i>Jayanth Regatti, Hao Chen, Abhishek Gupta</i> | |
| CoBAAF: Controlled Bayesian Air Aggregation Federated Learning from Heterogeneous Data | 14 |
| <i>Tomer Gafni, Kobi Cohen, Yonina C. Eldar</i> | |
| Ensuring the Defense of Paths and Perimeters in Dynamic Defender-Attacker Blotto Games (dDAB) on Graphs | 18 |
| <i>Bryce L. Ferguson, Daigo Shishika, Jason R. Marden</i> | |
| Over-the-Air Federated Learning with Privacy Protection Via Correlated Additive Perturbations | 25 |
| <i>Jialing Liao, Zheng Chen, Erik G. Larsson</i> | |
| Permutation Codes for Correcting a Burst of at Most t Deletions | 33 |
| <i>Shuche Wang, Yuanyuan Tang, Ryan Gabrys, Farzad Farnoud</i> | |
| Bounds on Reversible, Complement, Reversible-Complement, Constant Weight Sum Codes..... | 39 |
| <i>Krishna Gopal Benerjee, Adrish Banerjee</i> | |
| Extracting Unique Information Through Markov Relations | 47 |
| <i>Keerthana Gurushankar, Praveen Venkatesh, Pulkit Grover</i> | |
| Quickest Detection of a Threat to an Impending Disaster..... | 53 |
| <i>Tim Brucks, Taposh Banerjee, Rahul Mishra</i> | |
| Online Detection of Cascading Change-Points Using Diffusion Networks | 60 |
| <i>Rui Zhang, Yao Xie, Rui Yao, Feng Qiu</i> | |
| Bandits with Dynamic Arm-Acquisition Costs | 66 |
| <i>Anand Kalvit, Assaf Zeevi</i> | |
| Uncertainty in Biometric Identification and Authentication Systems with Strong Secrecy | 73 |
| <i>Linghui Zhou, Tobias J. Oechtering, Mikael Skoglund</i> | |
| Linear Coding for Gaussian Two-Way Channels..... | 79 |
| <i>Junghoon Kim, Seyyedali Hosseinalipour, Taejoon Kim, David J. Love, Christopher G. Brinton</i> | |
| Finite-Blocklength Results for the A-Channel: Applications to Unsourcesed Random Access and Group Testing..... | 87 |
| <i>Alejandro Lancho, Alexander Fengler, Yury Polyanskiy</i> | |
| On the Symmetries of the Deletion Channel | 95 |
| <i>Francisco Pernice</i> | |
| Repeated Games, Optimal Channel Capture, and Open Problems for Slotted Multiple Access | 101 |
| <i>Michael J. Neely</i> | |
| Efficient Sequential UCB-Based Hungarian Algorithm for Assignment Problems | 109 |
| <i>Yuyang Shi, Yajun Mei</i> | |

| | |
|---|-----|
| Decentralized Anomaly Detection Via Deep Multi-Agent Reinforcement Learning..... | 117 |
| <i>Hadar Szostak, Kobi Cohen</i> | |
| Oversquashing in GNNs Through the Lens of Information Contraction and Graph Expansion | 121 |
| <i>Pradeep Kr. Banerjee, Kedar Karhadkar, Yu Guang Wang, Uri Alon, Guido Montúfar</i> | |
| Classifying Incomplete Data with a Mixture of Subspace Experts | 129 |
| <i>Ben A. Kizaric, Daniel L. Pimentel-Alarcón</i> | |
| Multivariate Feature Extraction..... | 137 |
| <i>Xiangxiang Xu, Lizhong Zheng</i> | |
| On Sample Complexity of Learning Shared Representations: The Asymptotic Regime | 145 |
| <i>Xinyi Tong, Xiangxiang Xu, Shao-Lun Huang</i> | |
| Distributed Consensus-Based Kalman Filter Under Limited Communication..... | 153 |
| <i>Diego R. Benalcazar, Chinwendu Enyioha</i> | |
| Decentralized Online Influence Maximization..... | 160 |
| <i>Yigit E. Bayiz, Ufuk Topcu</i> | |
| Learning-Based Optimal Admission Control in a Single Server Queuing System..... | 168 |
| <i>Yili Zhang, Asaf Cohen, Vijay G. Subramanian</i> | |
| Trimmed Minimum Error Entropy for Robust Online Regression..... | 170 |
| <i>Sajjad Bahrami, Ertem Tuncel</i> | |
| May the Force Be with You | 178 |
| <i>Yulan Zhang, Anna C. Gilbert, Stefan Steinerberger</i> | |
| Reachability of Chen-Fliess Series: A Gradient Descent Approach..... | 186 |
| <i>Ivan Perez Avellaneda, Luis A. Duffaut Espinosa</i> | |
| Schedule Based Temporal Difference Algorithms | 193 |
| <i>Rohan Deb, Meet Gandhi, Shalabh Bhatnagar</i> | |
| A Concentration Bound for Distributed Stochastic Approximation..... | 199 |
| <i>Harsh Dolhare, Vivek Borkar</i> | |
| Exploration, Exploitation, and Engagement in Multi-Armed Bandits with Abandonment | 205 |
| <i>Zixian Yang, Xin Liu, Lei Ying</i> | |
| Quickest Change Detection Using Time Inconsistent Anticipatory and Quantum Decision Modeling | 207 |
| <i>Vikram Krishnamurthy, Luke Snow</i> | |
| Policy Gradient Based Entropic-VaR Optimization in Risk-Sensitive Reinforcement Learning..... | 215 |
| <i>Xinyi Ni, Lifeng Lai</i> | |
| The Inverse Problem of Linear-Quadratic Differential Games: When is a Control Strategies Profile Nash?..... | 221 |
| <i>Yunhan Huang, Tao Zhang, Quanyan Zhu</i> | |
| Adversarial Examples for Model-Based Control: A Sensitivity Analysis..... | 228 |
| <i>Po-Han Li, Ufuk Topcu, Sandeep P. Chinchali</i> | |

| | |
|--|-----|
| System Identification Entropy for Chen-Fliess Series and Their Interconnections | 235 |
| <i>W. Steven Gray</i> | |
| Risk-Aware Safe Optimal Control of Uncertain Linear Systems | 241 |
| <i>Pouria Tooranjipour, Bahare Kiumarsi, Hamidreza Modares</i> | |
| Queueing Delay Minimization in Overloaded Networks Via Rate Control | 246 |
| <i>Xinyu Wu, Dan Wu, Eytan Modiano</i> | |
| Age of Information Process Under Strongly Mixing Communication - Moment Bound, Mixing Rate and Strong Law | 254 |
| <i>Adrian Redder, Arunselvan Ramaswamy, Holger Karl</i> | |
| ASUMAN: Age Sense Updating Multiple Access in Networks..... | 262 |
| <i>Purbesh Mitra, Sennur Ulukus</i> | |
| Universal Policy Tracking: Scheduling for Wireless Networks with Delayed State Observation | 269 |
| <i>Bai Liu, Eytan Modiano</i> | |
| Pricing, Competition and Market Segmentation in Ride Hailing | 277 |
| <i>Tushar Shankar Walunj, Shiksha Singhal, Veeraruna Kavitha, Jayakrishnan Nair</i> | |
| GRAND: A Gradient-Related Ascent and Descent Algorithmic Framework for Minimax Problems | 285 |
| <i>Xiaochun Niu, Ermin Wei</i> | |
| On the Sample Complexity of Stabilizing LTI Systems on a Single Trajectory (Extended Abstract) | 287 |
| <i>Yang Hu, Adam Wierman, Guannan Qu</i> | |
| Wholesale Market Participation of Storage with State-of-Charge Dependent Bids | 289 |
| <i>Cong Chen, Lang Tong</i> | |
| Synchronized Stop and Re-Start in Distributed Average Consensus for Control and Coordination Applications..... | 297 |
| <i>Nicolaos E. Manitaras, Christoforos N. Hadjicostis, Themistoklis Charalambous</i> | |
| Unbounded Gradients in Federated Learning with Buffered Asynchronous Aggregation | 304 |
| <i>Mohammad Taha Toghiani, César A. Uribe</i> | |
| Understanding the Generalization Power of Overfitted NTK Models: 3-Layer vs. 2-Layer (Extended Abstract)..... | 312 |
| <i>Peizhong Ju, Xiaojun Lin, Ness B. Shroff</i> | |
| Model-Enhanced Localization of Forced Oscillation Using PMU Data | 314 |
| <i>Bernard C Lesieutre, Yasmine Abdennadher, Sandip Roy</i> | |
| Reinforcement Learning Using Physics Inspired Graph Convolutional Neural Networks..... | 322 |
| <i>Tong Wu, Anna Scaglione, Daniel Arnold</i> | |
| Data-Driven Estimation of Probabilistic Constraints for Network-Safe Distributed Energy Resource Control..... | 330 |
| <i>Sunho Jang, Necmiye Ozay, Johanna L. Mathieu</i> | |
| Individual Altruism Cannot Overcome Congestion Effects in a Global Pandemic Game | 338 |
| <i>Philip N. Brown, Brandon Collins, Colton Hill, Gia Barboza, Lisa Hines</i> | |
| An Interactive Search Game with Two Agents | 344 |
| <i>Xing Gao, Lev Reyzin</i> | |

| | |
|--|-----|
| Identifying Impactful Agents Via Faux Adversarial Games | 352 |
| <i>Carmel Fiscko, Soumya Kar, Bruno Sinopoli</i> | |
| Managing Resources in Multi-Resource General Lotto Games | 359 |
| <i>Adel Aghajan, Keith Paarporn, Jason R. Marden</i> | |
| Equilibrium Analysis of Game on Heterogeneous Networks with Coupled Activities | 361 |
| <i>Jean-Baptiste Seby, Charles Harvey, Saurabh Amin</i> | |
| Rubik Tables, Stack Rearrangement, and Multi-Robot Path Planning | 369 |
| <i>Teng Guo, Si Wei Feng, Mario Szegedy, Jingjin Yu</i> | |
| Proximal Methods for Self-Healing and Exact Distributed Convex Optimization Extended Abstract | 373 |
| <i>Randy A. Freeman</i> | |
| Towards Optimal Primary- And Secondary-Control Design for Networks with Generators and Inverters..... | 380 |
| <i>Manish K. Singh, D. Venkatramanan, Sairaj Dhople</i> | |
| Compensating Network Dynamics in Grid-Forming Control | 386 |
| <i>Dominic Groß</i> | |
| Dynamic Performance of Unified Grid-Forming/Following Inverter Control | 394 |
| <i>Sijia Geng, Ian A. Hiskens</i> | |
| Minimum-Length Trace Reconstruction Via Integer Programming..... | 402 |
| <i>Huanran Li, Daniel Pimentel-Alarcón</i> | |
| Controlled Sensing with Corrupted Commands | 410 |
| <i>Meng-Che Chang, Shi-Yuan Wang, Matthieu R. Bloch</i> | |
| An Information-Theoretic Analysis of Bayesian Reinforcement Learning..... | 417 |
| <i>Amaury Gouverneur, Borja Rodríguez-Gálvez, Tobias J. Oechtering, Mikael Skoglund</i> | |
| Finite-State Mutual Dimension | 424 |
| <i>Adam Case, Jack H. Lutz</i> | |
| On Learning a Hidden Directed Graph with Path Queries | 432 |
| <i>Mano Vikash Janardhanan, Lev Reyzin</i> | |
| A Kernel Analysis of Feature Learning in Deep Neural Networks | 437 |
| <i>Abdulkadir Canatar, Cengiz Pehlevan</i> | |
| Evaluating Interpretations of Deep-Learned Error-Correcting Codes | 445 |
| <i>A. Mulgund, R. Shekhar, N. Devroye, G. Turán, M. Žeřfran</i> | |
| How to Charge Lightning: The Economics of Bitcoin Transaction Channels..... | 453 |
| <i>Simina Brânzei, Erel Segal-Halevi, Aviv Zohar</i> | |
| Achievable Rate Regions for the Gaussian Broadcast Channel with Fixed Blocklength and Per User Reliability | 461 |
| <i>Paul Sheldon, Bisma Smida, Natasha Devroye, Daniela Tuninetti</i> | |
| Commitment Over Multiple-Access Channels | 467 |
| <i>Rémi Chou, Matthieu R. Bloch</i> | |

| | |
|---|-----|
| Throughput Optimized Random Access Channel Assignment | 473 |
| <i>Abhinanda Dutta, Steven Weber</i> | |
| On the Limits of Distributed Agreement Between Correlated Sources..... | 481 |
| <i>Jonathan Ponniah</i> | |
| Multi-Message Private Information Retrieval: A Scalar Linear Solution | 488 |
| <i>Ningze Wang, Anoosheh Heidarzadeh, Alex Sprintson</i> | |
| Multi-Pose Fusion for Sparse-View CT Reconstruction Using Consensus Equilibrium..... | 496 |
| <i>Diyu Yang, Craig A. J. Kemp, Gregory T. Buzzard, Charles A. Bouman</i> | |
| Bias in Stochastic Approximation Cannot Be Eliminated with Averaging | 501 |
| <i>Caio Kalil Lauand, Sean Meyn</i> | |
| Practical Control Design for the Deep Learning Age: Distillation of Deep RL-Based Controllers | 505 |
| <i>Nathan Dahlin, Kevin Chang, Krishna Chaitanya Kalagarla, Rahul Jain, Pierluigi Nuzzo</i> | |
| Learning Preference Distributions from Distance Measurements | 513 |
| <i>Gokcan Tatli, Rob Nowak, Ramya Korlakai Vinayak</i> | |
| Optimal Discrimination Between Two Pure States and Dolinar-Type Coherent-State Detection..... | 521 |
| <i>Itamar Katz, Yuval Kochman</i> | |
| Alternating Direction Method of Multipliers for Decomposable Saddle-Point Problems..... | 522 |
| <i>Mustafa O. Karabag, David Fridovich-Keil, Ufuk Topcu</i> | |
| Q-Linear Convergence of Distributed Optimization with Barzilai-Borwein Step Sizes | 530 |
| <i>Iyanuoluwa Emiola, Chinwendu Enyioha</i> | |
| Distributed Online Non-Convex Optimization with Composite Regret..... | 538 |
| <i>Zhanhong Jiang, Aditya Balu, Xian Yeow Lee, Young M. Lee, Chinmay Hegde, Soumik Sarkar</i> | |
| The Effects of Varying Charging Rates on Optimal Charging Station Choices for Electric Vehicles | 546 |
| <i>Lihui Yi, Ermin Wei</i> | |
| Covering Properties of Sum-Rank Metric Codes | 551 |
| <i>Cornelia Ott, Hedongliang Liu, Antonia Wachter-Zeh</i> | |
| Hardness of Linear Index Coding on Perturbed Instances..... | 558 |
| <i>Dror Chawin, Ishay Haviv</i> | |
| Degree Tables for Private Information Retrieval | 565 |
| <i>Fatemeh Kazemi, Ningze Wang, Rafael G. L. D'Oliveira, Alex Sprintson</i> | |
| Secure Linear MDS Coded Matrix Inversion..... | 573 |
| <i>Neophytos Charalambides, Mert Pilanci, Alfred O. Hero</i> | |
| Grassmannian Packings: Trust-Region Stochastic Tuning for Matrix Incoherence..... | 581 |
| <i>Josiah Park, Carlos Saltijeral, Ming Zhong</i> | |
| An Error Exponent for the AWGN Channel with Decision Feedback and Lattice Coding..... | 587 |
| <i>Kenneth Palacio-Baus, Natasha Devroye</i> | |

Author Index