Abstract

Orthogonal Precoders For Integer-Forcing Multiple Input Multiple Output (MIMO) Channels based on Steepest Gradient-Based

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In this talk, we will first briefly introduce integer-forcing linear receivers for MIMO Channels. We will then develop an orthogonal precoding scheme for integer-forcing (IF) linear receivers. For finding ``good'' orthogonal precoder matrices, we propose an efficient algorithm based on the steepest gradient algorithm that exploits the geometrical properties of orthogonal matrices as a Lie group. The proposed algorithm has low complexity and can be easily applied to an arbitrary MIMO configuration. We also confirm numerically that the proposed orthogonal precoding outperforms UPIF type II in some scenarios and the X-precoder in high-order QAM schemes, e.g., 64- and 256-QAM.

Biography:

Dr. Amin Sakzad has got a Ph.D. degree in Applied Mathematics from Amirkabir University of Technology (AUT), Tehran, Iran, 2011. He was a research visitor and a lecturer at Carleton University, Ottawa, Canada, in 2010. He was a research lecturer at AUT in 2011. Starting from Jan. 2012, he was a research fellow at Software Defined Telecommunications (SDT) Laboratory in the Department of Electrical and Computer Systems Engineering at Monash University under supervision of Prof. Emanuele Viterbo. From Feb. 2015 to April 2017, he was a research fellow at Clayton School of Information Technology at Monash University under supervision of Dr. Ron Steinfeld. As of May 2017, he is a Lecturer (Assistant Professor) at Faculty of Information Technology at Monash University.

Publication of speakers:

1. Kuchta, Veronika & Sakzad, Amin & Stehlé, Damien & Steinfeld, Ron & Sun, Shi-Feng. (2020). Measure-Rewind-Measure: Tighter Quantum Random Oracle Model Proofs for One-Way to Hiding and CCA Security. 10.1007/978-3-030-45727-3_24.

2. Giti, Jishan-E & Sakzad, Amin & Srinivasan, B. & Kamruzzaman, Joarder & Gaire, Raj. (2020). Secrecy capacity against adaptive eavesdroppers in a random wireless network using friendly jammers and protected zone. Journal of Network and Computer Applications. 165. 102698. 10.1016/j.jnca.2020.102698.

3. Kuchta, Veronika & Sakzad, Amin & Stehlé, Damien & Steinfeld, Ron & Sun, Shi-Feng. (2020). Measure-Rewind-Measure: Tighter Quantum Random Oracle Model Proofs for One-Way to Hiding and CCA Security.

4. Sun, Shi-Feng & Sakzad, Amin & Steinfeld, Ron & Liu, Joseph & Gu, Dawu. (2020). Public-Key Puncturable Encryption: Modular and Compact Constructions. 10.1007/978-3-030-45374-9_11.

5. Bai, Shi & Das, Dipayan & Hiromasa, Ryo & Rosca, Miruna & Sakzad, Amin & Stehlé, Damien & Steinfeld, Ron & Zhang, Zhenfei. (2020). MPSign: A Signature from Small-Secret Middle-Product Learning with Errors. 10.1007/978-3-030-45388-6_3.