

CHINMAYANANDA A

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EDUCATION

Doctor of Philosophy (Ph.D)

Specialization : Coding Theory

Branch : Electrical and Communication Engineering

Institute : Indian Institute of Science (IISc), Bengaluru.

August 2015 - January 2020

CGPA - 6.8/8

Bachelor of Engineering (B.E)

Branch : Electronics and Communication Engineering

Institute : B. M. S. College of Engineering, Bengaluru.

August 2008 - May 2012

CGPA - 9.02/10

RESEARCH INTERESTS

My initial research has been in the area of cooperative communications and wireless communications. I am now working on applications of Deep Learning and Reinforcement Learning to these areas.

DISSERTATION

Title : "Optimal code constructions for some multi-sender index coding problems"

Advisor : Prof. Balaji Sundar Rajan

The multi-sender index coding problem is related to many problems of practical interest such as multi-source satellite communication, multi-source coded caching, coded cooperative data exchange and distributed computing, among many others. An instance of the multi-sender index coding problem consists of a set of senders collectively having all the messages demanded by a set of receivers. Each receiver knows a subset of messages a priori, called its side information, and receives all the transmissions from all the senders. Each sender avails the knowledge of the side information and the demands of all the receivers, and the knowledge of messages available with other senders, to broadcast coded messages called an index code. Transmissions of each sender are orthogonal in time with those of others. The objective is to minimize the total number of coded transmissions, such that each receiver can decode its demands. The problem is NP-hard and the optimal code length is known only for a few special classes of the problem. In this work, we construct optimal codes for many classes of multi-sender index coding problems. Index codes with error correction and index codes with weak security are also considered.

INDUSTRY EXPERIENCE

IC Design Engineer, SignalChip Innovations Private Ltd., Bengaluru. June 2012 - May 2015.

I have been responsible for architecting (designing), coding and verifying many hardware signal processing blocks like FFT, Reed Muller Decoder and many other blocks in 3G and 4G downlink chains in fixed point arithmetic, using Verilog, System Verilog, C, and Octave. I have also co-mentored my juniors in industry.

ACADEMIC EXPERIENCE

Assistant Professor, PES University, EC Campus, Bengaluru. January 2020 - January 2021.

I have taught Analog Communications, Digital Communications, Probability and Random Processes, Artificial Neural Networks and VLSI for DSP.

ACHIEVEMENTS

- I had been awarded the “Star Performer” certificate of excellence for my contributions in Signalchip Innovations Pvt Ltd.
- I had been selected to participate in Indian National Mathematical Olympiad Training Camp held at IISc after being successful at the Karnataka Regional Mathematical Olympiad in 2006-2007.

PUBLICATIONS

Total Citations - 26.

Journals

- C. Arunachala, S. D. Buch and B. S. Rajan, “Wireless Bidirectional Relaying Using Physical Layer Network Coding With Heterogeneous PSK Modulation,” in *IEEE Transactions on Vehicular Technology*, vol. 67, no. 3, pp. 2335-2344, March 2018.
- C. Arunachala, V. Aggarwal, and B. S. Rajan, “Optimal Linear Broadcast Rates of Some Two-Sender Unicast Index Coding Problems,” *IEEE Transactions on Communications*, vol. 67, no. 6, pp. 3965-3977, June 2019.
- C. Arunachala, V. Aggarwal, and B. S. Rajan, “On the Optimal Broadcast Rate of the Two-Sender Unicast Index Coding Problem with Fully-Participated Interactions,” *IEEE Transactions on Communications*, vol. 67, no. 12, pp. 8612-8623, Dec. 2019.

Conferences

- C. Arunachala, S. D. Buch and B. S. Rajan, “Wireless bidirectional relaying using Physical Layer Network Coding with heterogeneous PSK modulation,” in *Proceedings of IEEE 28th International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)*, Montreal, QC, 2017, pp. 1-7.
- C. Arunachala, and B. S. Rajan, “Optimal Scalar Linear Index Codes for Some Classes of The Two-Sender Unicast Index Coding Problem,” in *Proceedings of International Symposium on Information Theory and Its Applications (ISITA-2018)*, Singapore, Oct. 2018, pp. 105-109.
- C. Arunachala, and B. S. Rajan, “Optimal Scalar Linear Codes for a Class of Jointly Extended Groupcast Index Coding Problems,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT-2019)*, Paris, Jul. 2019, pp. 1237-1241.
- C. Arunachala, V. Aggarwal, and B. S. Rajan, “Optimal Broadcast Rate of a Class of Two-Sender Unicast Index Coding Problems,” in *Proceedings of IEEE Information Theory Workshop (ITW-2019)*, Visby, Sweden, Aug. 2019 (To appear online).
- C. Arunachala, and B. S. Rajan, “Optimal Error Correcting Index Codes for Extended Index Coding Problems,” in *Proceedings of International Symposium on Communication and Information Technologies (ISCIT-2019)*, Ho Chi Minh City, Vietnam, Sept. 2019, pp. 531-536.
- C. Arunachala, V. K. Gangwar, and B. S. Rajan, “Linear Codes for Broadcasting with Noisy Side-information and Different Error Thresholds,” in *Proceedings of IEEE Global Communication Conference (Globecom-2019)*, 9-13 December, Waikoloa, HI, USA, 2019.