THE UNIVERSITY



Department of Mathematics

## Seminar

## **Communications Aspects of the Primitive Diamond Relay Channel**

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## Abstract

This talk focuses on the frequency-selective symmetric Gaussian primitive diamond relay channel with oblivious processing. The Gaussian input frequency power distribution that maximizes the information rate of the oblivious relay operation achieved by optimal distributed (Wyner-Ziv based) compression with joint decompression-decoding is determined. The Gaussian primitive diamond relay channel with correlated (positive and negative correlation) additive noise in both relays, modeling an interferer (jammer), is also addressed, considering optimal distributed compression. Closed form analytic expressions for the achievable oblivious processing rate are found. Non-oblivious relay processing combining Compress-Forward (CF) and Decode-Forward (DF) is examined. It is shown that time-sharing between CF and DF is advantageous over the superposition CF-DF coding methodology, for independent and correlated Gaussian noise at the relays. Superposition DF and CF where the DF part uses dirty-paper (DP) coding to eliminate the interference of the CF part at each relay is also considered. This communication setting motivates the presented correlated noise model employing optimal distributed compression. It is proved that also with the DP coding procedure, optimized time-sharing approach is advantageous. Performance of time-sharing is demonstrated also for an asymmetric and frequency-selective channel.

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Date:	June 23, 2023 (Friday)
Time:	3:00pm – 4:00pm
Venue:	Room 210, Run Run Shaw Bldg., HKU
	and
	Zoom: <u>https://hku.zoom.us/j/</u>
	Meeting ID: 940 3790 6159
	Password: 720261