

THE UNIVERSITY



OF HONG KONG

*Institute of Mathematical Research  
Department of Mathematics*

# COLLOQUIUM

## Distributed Hypothesis Testing Over AWGN Channels

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### Abstract

Distributed learning is an important topic in information theory, and is recently an active research area in machine learning. However, it is challenging to characterize the fundamental limit of distributed learning problems with communication constraint. Most of the current information theoretical works focused on applying random coding to obtain achievability results, where the optimality is hardly to be verified. Moreover, random coding schemes are computationally difficult to be applied in real federated learning scenarios.

In this talk, we investigate the distributed hypothesis testing problem in AWGN channels. To address the computational issue, we propose to focus on coding schemes based on the empirical distributions instead of the original data. Under such formulation, we further propose a coding strategy based on the mixture of decode-and-forward and amplify-and-forward, where the achievable detection error exponent can be characterized and interpreted by information geometry. Moreover, we demonstrate the optimality of such an achievable error exponent by a genie-aided approach. Finally, we characterize the necessary amount of power to achieve the optimal error exponent.

Date: July 24, 2023 (Monday)
Time: 11:00am - 12:00noon
Venue: Room 210, Run Run Shaw Bldg., HKU

*All are welcome*