

國立中山大學應用數學系

學術演講

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講題：Channel Manipulation as a Coding Technique

時間：2023/10/25 (Wednesday) 16:00~17:00

地點：理 SC 4011 教室

茶會：15:30

Abstract

Mathematical breakthroughs are often made by making the abstract concrete. For example, additive continuous map from \mathbb{R}^m to \mathbb{R}^n sounds complicated, but $m \times n$ matrix sounds a lot better. In coding theory, there is a similar breakthrough: Traditionally, channel coding is about how to manipulate bits and symbols. However, we can see it as a way to manipulate channels as if channels were concrete objects.

By treating channels as concrete objects, we can study the convergence of a sequence of channels, partial orders on channels, and even distributions on the space of all channels. This viewpoint has proven powerful for the design and analysis of polar codes and low-density parity-check (LDPC) codes. These two codes achieve Shannon capacity and are the two pillars of the 5G standard. In this talk, I will give an overview of recent advanced results regarding polar and LDPC codes, discuss some challenges for 6G, and remark on their relations to physics.

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