THEORY LECTURE: Elements of Quantum Shannon Theory (I)

ANDREAS WINTER

November 03, 2020
10:00 to 12:00
Online (Teams)

Course Outline

The lecturer will present the basics of quantum Shannon theory from a strict one-shot perspective. This means that the quantities, min- and max-entropies, are intimately related to operational tasks, and the deceptively familiar von Neumann entropies only emerge in suitable asymptotic limits.
We will aim to cover the following information processing tasks and quantities:

Quantum data compression (max-entropy)
Privacy amplification (min-entropy)
Entanglement distillation by LOCC (conditional max-entropy)
Quantum state merging (conditional min-entropy)

In the asymptotic limit, von Neumann entropy and conditional entropy emerge, via the asymptotic equipartition property (AEP), and we can even derive the basic laws for the von Neumann entropy by information theory. Time permitting, we will touch upon several other quantities and their operational interpretation.

Due to recommendations in place to contribute containing the spreading of COVID-19, th Theory Lectures will be carried out remotely via MS Teams. In case you want to receive n invitation to attend the online session, you can send an email tAlba.Berenguer@icfo.eu
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