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Title: Measurement simulability and no-free-information principle in general probabilistic theories

Abstract:

The existence of incompatibility is one of the most fundamental features of quantum theory, and can be found at the core of many of the theory's distinguishing features, such as Bell inequality violations. A scheme for obtaining new observables from existing ones via classical operations, the so-called simulation of observables, has led to an extension of the notion of compatibility for measurements. We consider the simulation of observables within the operational framework of general probabilistic theories, and introduce the concept of simulation irreducibility. While a simulation irreducible observable can only be simulated by itself, we show that any observable can be simulated by simulation irreducible observables. We see that the concept of simulation irreducibility has a key role in the general characterization of the no-free-information principle that in quantum theory states that those observables that can be measured jointly with any other observable must be trivial.