

Quantum theory and signal analysis as theories of optimal observation

Sven Aerts

Abstract

There is an ongoing debate in the literature that seeks to clarify to what extent quantum theory is a physical theory, and to what extent it is an alternative information theory. Regardless of one's position, it is probably sufficiently vague and hence safe to say that quantum theory outlines the theoretical best way to obtain information about physical quantities in the light of fundamental limitations on the acquisition of information. There exist indeed several arguments in the literature that aim to show Hilbert space is the proper state space to deal with statistical observations in an "optimal" way. We will present a few of these arguments and examine the consequences for quantum theory, as well as for that other famous theory in Hilbert space: signal analysis.