On orthoposets of numerical events

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Abstract

Let S be a set of states of a physical system and $p(s)$ be the probability of the occurrence of an event when the system is in state $s \in S$. Such a function $p : S \to [0,1]$ is known as a numerical event or more accurately S-probability. A set P of numerical events including the constant functions 0 and 1 and $1 - p$ with every $p \in P$ becomes a poset when ordered by the order of real functions and can serve as a general setting for quantum logics. We call such a poset P a general set of events (GSE). The thoroughly investigated algebras of S-probabilities (including Hilber-logics), concrete logics and Boolean algebras can all be represented within this setting. In this paper we study various classes of GSEs, in particulatr those that are orthoposets, their interrelations and connections to known logics and we characterize GSEs as posets by means of states. Morover, we discuss the situation for GSEs to be lattices.

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