

# Conditional states on D-posets

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## Abstract

Conditional probability plays a basic role in the classical probability theory. Some of the most important areas of the theory such as martingales, stochastic processes rely heavily of this concept. Conditional probabilities on a classical measurable space are studied in several different ways, but result in equivalent theories. The classical probability theory does not describe the causality model.

The situation changes when non-standard spaces are considered. For example, it is well known that the set of random events in quantum mechanics experiments is a more general structure than Boolean algebra. In the quantum logic approach the set of random events is assumed to be a quantum logic  $L$ . Such model can be found not only in the quantum theory, but also in economics, biology etc.

In this paper we will study a conditional state on a D-poset ([1]) using Renyi's approach (or Bayesian principle). This approach helps us to define such independence of events that admits the situation completely different from that one known in the classical probability theory. Namely, if an event  $a$  is independent of an event  $b$ , then the event  $b$  can be dependent on the event  $a$  (problem of causality) ([2], [3]).

Comparison of conditional probability on regular and non-regular quantum structures is also specified.

## References

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- [3] Nánásiová O.: *Principle conditioning*, Int. Jour. of Theor. Phys., Vol 43, No. 7, July 2004.