Vol, E. D.
Quantum theory as a relevant framework for the statement of probabilistic and many-valued logic. (English) Zbl 1264.81268
Int. J. Theor. Phys. 52, No. 2, 514-523 (2013).

Summary: Based on ideas of quantum theory of open systems we propose the consistent approach to the formulation of logic of plausible propositions. To this end we associate with every plausible proposition diagonal matrix of its likelihood and examine it as density matrix of relevant quantum system. We are showing that all logical connectives between plausible propositions can be represented as special positive valued transformations of these matrices. We demonstrate also the above transformations can be realized in relevant composite quantum systems by quantum engineering methods. The approach proposed allows one not only to reproduce and generalize results of well-known logical systems (Boolean, Lukasiewicz and so on) but also to classify and analyze from unified point of view various actual problems in psychophysics and social sciences.

MSC:
81S22 Open systems, reduced dynamics, master equations, decoherence
81P15 Quantum measurement theory, state operations, state preparations
03B45 Modal logic (including the logic of norms)
03B42 Logics of knowledge and belief (including belief change)

Keywords:
Kraus representation; Lindblad equation; human reflexive choice

Full Text: DOI arXiv

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