



## Chapter I ,

### Introduction

Quantum probability, that is, the probability of a quantum system, is suspected to have a mathematical structure different from that of classical probability. This field of research is closely related to that of quantum logic, which concerns the logical structure of quantum mechanics.

In Chapter II, "The Interpretations of Quantum Mechanics," there is a survey of different interpretations, from the Copenhagen interpretation to the new transactional interpretation. In Chapter III we look at the quantum logic approach : nondistributive logic, many-valued logic, the axiomatic approach, generalizations and the topic of quantum logic and logic. Chapter IV deals with quantum probabilities. First, we introduce the axiomatic quantitative probability and the interpretation of the concept of probability. Then we present the quantum probability approach of Accardi, of Aerts and of Pitowsky.

Appendix A "Hilbert Spaces" and Appendix B "The Formalism of Finite Systems" provide the background for Chapter II. The Einstein-Podolsky-Rosen Paradox deserves its own place in Appendix C, while readers can look at relations and orders in Appendix D and lattice theory in Appendix E to gain a better understanding of the mathematics used in Chapter III. Appendix F contains definitions of



measurement of the first, second and third kind, mentioned in Chapter IV. Cross references are also provided, so readers can start at any chapter they like, although the central ideas of this study on quantum probabilities in the logic of quantum mechanics are presented in Chapter IV.



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