

Preface

Paolo Rocchi's book argues that the diversity of the interpretations of probability, in fact, is not a problem crying for immediate resolution, but a very natural situation for a scientist working on concrete applications of probability and statistics. One need not keep to just one concrete interpretation, say to the frequency interpretation. In the debate on interpretations of probability, which has been continuing for centuries, the idea that interpretations can vary depending on the problems under study can be considered as opportunistic. The probabilistic community is sharply divided into camps struggling to justify one or other concrete interpretation. For example, Kolmogorov and Gnedenko actively supported the objective interpretation, and they strongly criticized the subjective approach (however, this did not affect the friendly relations between Kolmogorov and De Finetti). Although both Kolmogorov and von Mises kept to the objective interpretation, they fiercely debated the primacy of frequency or measure-theoretic probability. It is interesting that although Kolmogorov debated von Mises' fundamental frequentism, till his death he remained not completely satisfied by his (Kolmogorov's) measure-theoretic axiomatics. He worked hard to find a mathematically rigorous definition of a random sequence and, in spite of an era of a few brilliant new ideas, such as Kolmogorov's algorithmic complexity, the aforementioned problem is still open.

This book presents an in-depth analysis of the basic interpretations of probability and it can be considered as an attempt to combine them harmoniously on the basis of the pluralist approach: "interpretations can be chosen depending on applications." This is a complex research project and it is far from being complete. Nevertheless, the book can be considered as one of the most important contributions to the analysis of the interpretational problems of probability theory, at least in the last 10–15 years.

Although personally I do not support the author's pluralism (I consider the diversity of interpretations a sign of the deep crises in the foundations of probability as the result of the absence of rigorous mathematical theory of individual random sequence), I have to agree with his observation that if one of the basic interpretations, e.g., frequency or subjective, were wrong, we would have long seen problems with applications.

I also point to the similarity between the present interpretational statuses of probability theory and quantum mechanics. It might be that the interpretational problems of the latter are generated by the interpretational problems of the former.

A collateral message of this book is that developing the pluralist viewpoint on probability will contribute to multidisciplinary applications of probability, but it is not the final word on the problem of interpretations of probability. I hope it will pave the way for many new books to come.

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