

Probabilistic Symmetries and Invariance Principles (Probability and Its Applications)

By Olav Kallenberg



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This is the first comprehensive treatment of the three basic symmetries of probability theory - contractability, exchangeability, and rotatability - defined as invariance in distribution under contractions, permutations, and rotations. Originating with the pioneering work of de Finetti from the 1930's, the theory has evolved into a unique body of deep, beautiful, and often surprising results, comprising the basic representations and invariance properties in one and several dimensions, and exhibiting some unexpected links between the various symmetries as well as to many other areas of modern probability. Most chapters require only some basic, graduate level probability theory, and should be accessible to any serious researchers and graduate students in probability and statistics. Parts of the book may also be of interest to pure and applied mathematicians in other areas. The exposition is formally self-contained, with detailed references provided for any deeper facts from real analysis or probability used in the book.



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Editorial Review

Review

From the reviews of the first edition:

"The starting point of this book ... is de Finetti's famous theorem characterizing sequences of exchangeable random variables as mixtures of i.i.d. random variables. ... The monograph provides a tight approach to this subject based on modern mathematical tools ... and presents de Finetti's theorem in a new framework the monograph under review presents ... a profound and complete treatment of the topic. The reader interested in this field will find a comprehensive investigation leading to the actual frontiers of research." (Wilfried Hazod, Mathematical Reviews, Issue 2006 i)

"This elegantly written, graduate level monograph provides a comprehensive coverage of probabilistic symmetries. ... This book has an extensive bibliography and valuable, detailed historical notes that place the work in context and provide links to areas of application. The text conveys the author's enthusiasm for the subject and his deep understanding of the key structures gained over 30 years of active research into the subject." (Neville Weber, Zentralblatt MATH, Vol. 1084, 2006)

"The author achieves a remarkable level of clarity, economy, and accessibility ... with enviable skill and judgement. ... The book may thus be used as much as read in the future. ... A reader interested in exchangeability will find results a-plenty in this book As a whole, this is a grand conception, superbly realized." (Charles M. Goldie, Journal of the American Statistical Association, Vol. 102 (479), 2007)

From the Back Cover

This is the first comprehensive treatment of the three basic symmetries of probability theory?contractability, exchangeability, and rotatability?defined as invariance in distribution under contractions, permutations, and rotations. Originating with the pioneering work of de Finetti from the 1930's, the theory has evolved into a unique body of deep, beautiful, and often surprising results, comprising the basic representations and invariance properties in one and several dimensions, and exhibiting some unexpected links between the various symmetries as well as to many other areas of modern probability. Most chapters require only some basic, graduate level probability theory, and should be accessible to any serious researchers and graduate students in probability and statistics. Parts of the book may also be of interest to pure and applied mathematicians in other areas. The exposition is formally self-contained, with detailed references provided for any deeper facts from real analysis or probability used in the book.

Olav Kallenberg received his Ph.D. in 1972 from Chalmers University in Gothenburg, Sweden. After teaching for many years at Swedish universities, he moved in 1985 to the US, where he is currently Professor of Mathematics at Auburn University. He is well known for his previous books Random Measures (4th edition, 1986) and Foundations of Modern Probability (2nd edition, 2002) and for numerous research papers in all areas of probability. In 1977, he was the second recipient ever of the prestigious Rollo Davidson Prize from Cambridge University. In 1991–94, he served as the Editor in Chief of Probability Theory and Related Fields. Professor Kallenberg is an elected fellow of the Institute of Mathematical Statistics.

About the Author

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