

DIETRICH STOYAN, WILFRIED S. KENDALL, JOSEPH MECKE

**Stochastic Geometry and its Applications**

Second Edition.

John Wiley &amp; Sons, Chichester 1995.

436 pages.

ISBN 0-471-95099-8

In many applications in biology, medicine, geology and material research there is a need of quantitative description of geometrical structures. Analysis of spatial data from various measurements requires suitable mathematical models and special statistical methods. Stochastic geometry is a mathematical discipline which meets these demands. It arised in the seventies in systematic papers by D. G. Kendall, G. Matheron, K. Krickeberg and R. E. Miles using earlier achievements of geometrical probability and integral geometry. A part of stochastic geometry is stereology which studies problems of geometrical parameter estimation of three-dimensional structures from information of lower dimension, e.g. from sections and projections.

The aim of the enclosed monograph of three authors is to explain the methods of stochastic geometry to researchers in applied sciences, on the other hand the list of approaches is enough general and mathematically precise that it serves as a basic textbook for mathematicians. These two aims are in a small contradiction and the book results in a successful compromise. In many assertions the detailed proofs are omitted, they can be found by means of a large list of references. Some topics are illustrated by numerical examples with image input, others are completed by heuristic arguments. Further substantial parts are reduced to some remarks and references. The authors understand that the readers interested in the mathematical background will study related referenced papers, while non-mathematicians will be able to use and interpret most of formulas from the book only.

The structure of the text is characterized by going from special towards general. Therefore after presentation of mathematical background Chapters 2 and 3 are devoted to the Poisson point process and the Boolean model of random set. After that Chapters 4 and 5 explain general theory of point processes, while 6 and 7 the theory of random sets an random measures. Chapter 8 tends to the statistical theory of shape. In Chapters 9 and 10 further models of stochastic geometry, namely fibre processes, surface processes and random tessellations, are investigated. A large Chapter 11 is devoted to stereology, it makes use of some results of the whole previous text.

This is the second edition of the book. The readers acquainted with the first edition recognize that the structure, style and aims remained unchanged. They will be pleased by many new ideas and complementation by the recent development during last seven years. The progress from this period is apparent especially in parts devoted to the Boolean model, stereology, random shapes, Gibbs processes and random tessellations. However, the authors note that the topics of stochastic geometry and spatial statistics are not exhausted here with respect to the contents of further recent monographs: Cressie (1991) – spatial statistics, Falconer (1990), Stoyan and Stoyan (1994), Barden, Carne, Kendall and Le (1996) – random shapes, Schneider (1993) – integral geometry.

An excellent monograph of D. Stoyan, W. S. Kendall and J. Mecke is recommended for statisticians and mathematicians interested in stochastic modelling and geometry. It will help in laboratories of microscopy and image analysis, to mathematical physicists and research workers employed in above mentioned applied sciences.

*Viktor Beneš*