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BOOK REVIEW

ALAN F. KARR, *Point Processes and their Statistical Inference*. Dekker, New York, 1986, 504 pages, \$89.75 (adoption price \$39.75).

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A point process on a topological space E is a random, integer valued, measure on E (endowed with the Borel σ-algebra); it may be thought of as the measure which places unit mass at a random collection of points in E. The setting is sufficiently general to encompass a number of familiar paradigms (including, incidentally, independent and identically distributed sampling from a general space), clustering and marked processes, and rich enough to give rise to a deep and a substantial general theory. Both in general and in various specialised guises (for example as Poisson, Cox, renewal or stationary processes) point processes have proved enormously valuable as models for a wide range of phenomena. In this modelling context it is natural to ask two types of questions. The first concerns the probabilistic behaviour and related properties of the various types of processes, while the second involves making decisions, or inferences, about the specific process giving rise to a particular observed phenomenon. This book is designed to equip its reader with the machinery, results and insight to answer both types of questions.

The first two chapters of the book are devoted to probabilistic theory. Chapter One outlines what might be called the classical or distributional theory of point processes, including characterisations, convergence, transformations and approximations, marked and cluster processes and, finally, Palm distributions and stationary point processes. The second chapter deals with the more modern intensity theory of point processes on $\mathbb{R}^+$: with such a point process we can associate (effectively via the Doob–Meyer decomposition) a predictable process called a compensator (roughly analogous to a cumulative conditional hazard function except that, in general, it varies with the realisation of the point process and so is "random"). The difference between the point process and its compensator is a martingale, called the innovation process, and in many cases the compensator may be written as the integral of a positive predictable process called the stochastic intensity, the (random) hazard function of the above analogy. Having established this framework, the full weight of modern probability may be brought to bear, exploiting the martingale structure and predictability, to quite impressive effect. My only disappointment with the book, and then not an especially serious one, is that these chapters were not written in a slightly more leisurely style, at a somewhat lower level. All the bones of the subject are there, but very little of the flesh. The coverage is more than sufficient to make the book self-contained, but with a little more detail these chapters could happily stand alone as a very good introduction to point process theory.

Chapter Three sets the scene for a study of questions of inference for point processes, describing types of inference and the various possible forms of observa-

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