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Superdiffusion; Subdiffusion; CTRW equations; Asymptotic solution of the Montroll-Weiss problem; Two state model; Stable laws in chaos)

13. **Physics** (Lorentz dispersion profile; Stark effect in an electric field of randomly distributed ions; Dipoles and quadrupoles; Landau distribution; Multiple scattering of charged particles; Fractal turbulence; Stresses in crystalline lattices; Scale-invariant patterns in acicular martensites; Relaxation in glassy materials; Quantum decay theory; Localized vibrational states (fractions); Anomalous transit-time in some solids; Lattice percolation; Waves in medium with memory; The mesoscopic effect; Multiparticle production; Tsallis' distributions; Stable distributions and renormalization group)

14. **Radio physics** (Transmission line; Distortion of information phase; Signal and noise in a multichannel system; wavescattering in turbulent medium; Chaotic phase screen)

15. **Astrophysics and cosmology** (Light of a distant star; Cosmic rays; Stellar dynamics; Cosmological monopole and dipole; The Universe as a rippled water; The power spectrum analysis; Cell-count distribution for the fractal Universe; Global mass density for the fractal Universe)

16. **Stochastic algorithms** (Monte-Carlo estimators with infinite variance; Flux at a point; Examples; Estimation of a linear functional of a solution of an integral equation; Random matrices; Random symmetric polynomials)

17. **Financial applications** (More on stable processes; Multivariate stable processes; Stable portfolio theory; log-stable option pricing; Low probability and short-lived options; Parameter estimation and empirical issues)

18. **Miscellany** (Biology; Genetics; Physiology; Ecology; Geology)

The work will be interesting and useful to specialists of probability and mathematical statistics, as well as to professionals working with the applications of these fields. With its complete bibliography it reflects the actual state of research; hence it is to be expected that from now on no more essential results on stable densities and their applications can be published without citing this book.

CHENG, C.-L.; van NESS, J. W.: "Statistical Regression with Measurement Error". Arnold, 1999, London, XIV+262 pp, Hardcover, £35.00, ISBN 0 340 61461 7

Reviewed by Rainer Schwabe, Tübingen

"This book covers measurement error models, also called error-in-variables models, and a closely related model called the Berkson model. Three basic types of measurement error models are discussed: the structural model, the functional model and the ultrastructural model. Coverage includes models with and without equation error, vector explanatory variable models, and linear and polynomial models. Topics include model identifiability, parameter estimation, confidence intervals, asymptotic theory, finite sample properties of estimates, modified least squares techniques, nonnormal models, robust estimation methods, prediction, and statistical calibration" (from the Preface). The book replaces and substantially expands Chapter 29 entitled "Functional and Structural Relationships" of Kendall and Stuart's *Advanced Theory of Statistics, Vol. 2, 4*[th] *ed.* (1979), pp. 399–443.

In more detail, the first chapter provides an introduction to the most common situation of a simple linear regression model $y = \beta_0 + \beta_1\xi + \varepsilon$ where an observation y is described by a linear dependence on an explanatory variable ξ subject to a random error ε. In the present context of measurement errors (= errors in variables) the explanatory variable cannot be observed directly in contrast to standard theory of linear regression. Instead only noisy observations $x = \xi + \delta$ are available. Hence, estimation of the regression parameters β_0 and β_1 is much more complicated. In the functional model the underlying explanatory variables ξ_i are assumed to be fixed effects, whereas the structural model deals with random (stochastic) effects (ξ_i *iid* with common mean $E(\xi_i) = \mu$). More generally, in the ultrastructural model the explanatory variables ξ_i are independent with possibly varying means, $E(\xi_i) = \mu_i$. As a further generalization models with equation errors are considered when there are additional error terms q_i in the linear relationship $E(y_i) = \beta_0 + \beta_1 E(\xi_i) + q_i$. For designed experiments the Berkson model is introduced where the values x_i of the explanatory variable are fixed, while the underlying ξ_i are randomly disturbed. For all these measurement error models additional identifiability conditions are required for parameter estimation, even under the assumptions of normality on the errors and the random effects. The resulting estimates do not share the usual nice properties like unbiasedness and consistency. Thus, alternative approaches have to be chosen.

In the second chapter properties of estimates and predictors are exhibited like consistency and finite sample properties. Special emphasis is given to the construction of confidence regions. In particular, due to the Gleser-Hwang effect confidence regions have to be unbounded. In chapter 3 model assumptions are compared and both the generalized and the modified least squares method are introduced. Chapter 4 presents the concepts of instrumental variables and grouping variables (discrete instrumental variables) as alternative approaches to the measurement error model.

In contrast to the first four chapters which are all related to the linear regression model as the underlying relationship between observations and the (one-dimensional) explanatory variable more general settings are treated in the second half of the book. Chapter 5 presents linear measurement error models with vector explanatory variables when the underlying relationship is a multiple regression model. Chapter 6 deals with the polynomial measurement error model where a response curve or a response surface is to be fitted. In chapter 7 methods of robust estimation are discussed while the eighth chapter addresses additional topics covering some other latent variables models.

Exercises are given at the end of each chapter. The book is augmented by an appendix to which technicalities of identification in measurement error models are deferred, an extensive bibliography, and both an author and subject index.

According to the authors "this book is intended to be accessible to readers who have a background equivalent to a year's course in probability and theoretical statistics." No knowledge in measure theoretic is required. The monograph is devoted to the theoretical background of a statistical problem which is inherent in many practical applications. It can be highly recommended to serve well both as a text for a graduate course and as a reference source. I am glad to have a copy of it on my bookshelves.