STOCHASTIC METHODS AND THEIR APPLICATIONS



STOCHASTIC METHODS AND THEIR APPLICATIONS



STOCHASTIC METHODS AND THEIR APPLICATIONS

Papers in honour of CHRIS HEYDE

Edited byJ. GANI and E. SENETA



Published and distributed by Applied Probability Trust School of Mathematics and Statistics University of Sheffield Sheffield S3 7RH UK

www.appliedprobability.org

© Applied Probability Trust 2004

Authorisation to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by the Applied Probability Trust for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$0.70 per copy, plus 0.20 per page is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA 0021-9002/04/\$0.70 + 0.20

A catalogue record for this book is available from the British Library

ISBN 0-902016-07-5 ISSN 0021-9002

Printed at the Chiltern Press, Bicester, Oxfordshire, UK

 ${\it Cover design:} \ {\it Michael Simpson, Printing Resources, University of Sheffield}$

Frontispiece: Chris Heyde with his wife, Dr Beth Heyde, in the grounds of Government House, Canberra, following his investiture as a Member of the Order of Australia, April 2003

CONTENTS

Christopher Charles Heyde, AM, DSc, FAA, FASSA	vii
Publications of Christopher Charles Heyde	xi
Part 1. Branching processes	
RICHARD COWAN. A mosaic of triangular cells formed with sequential splitting rules	3
PETER JAGERS AND FIMA KLEBANER. Branching processes in near-critical random environments	17
P. RÉVÉSZ. A prediction problem of the branching random walk	25
Part 2. Estimation methods	
V. V. ANH, N. N. LEONENKO AND L. M. SAKHNO. Quasi-likelihood-based higher-order spectral estimation of random fields with possible long-range	
dependence	35
I. V. BASAWA AND J. ZHOU. Non-Gaussian bifurcating models and quasi-likelihood estimation	55
IRÈNE GIJBELS, PETER HALL AND ALOÏS KNEIP. Interval and band estimation for curves with jumps	65
IAIN M. JOHNSTONE AND BERNARD W. SILVERMAN. Boundary coiflets for wavelet shrinkage in function estimation	81
LEAH KELLY, ECKHARD PLATEN AND MICHAEL SØRENSEN. Estimation for discretely observed diffusions using transform functions	99
YX. LIN, D. STEEL AND R. L. CHAMBERS. Restricted quasi-score estimating functions for sample survey data	119
Part 3. Financial mathematics	
OLE E. BARNDORFF-NIELSEN, SVEND ERIK GRAVERSEN AND NEIL SHEPHARD. Power variation and stochastic volatility: a review and some new	
results	133
VICTOR H. DE LA PEÑA, RUSTAM IBRAGIMOV AND STEVE JORDAN. Option bounds	145
ROGER GAY. Pricing risk when distributions are fat tailed	157
EUGENE SENETA. Fitting the variance-gamma model to financial data	177
Part 4. Heavy-tail analysis	
SIDNEY RESNICK. On the foundations of multivariate heavy-tail analysis	191
JEF L. TEUGELS AND GIOVANNI VANROELEN. Box-Cox transformations and	
heavy-tailed distributions	213

vi Contents

Part 5. Properties of random variable	Part 5	Properties	of random	variables
---------------------------------------	--------	------------	-----------	-----------

N. H. BINGHAM AND H. R. NILI SANI. Summability methods and negatively associated random variables	231
TIMOTHY C. BROWN. Transforming a random variable to a prescribed distribution: an application to school-based assessment	239
HARRY KESTEN AND ROSS MALLER. Some effects of trimming on the law of the iterated logarithm	253
MARVIN K. NAKAYAMA, PERWEZ SHAHABUDDIN AND KARL SIGMAN. On finite exponential moments for branching processes and busy periods for queues	273
JORDAN STOYANOV. Stieltjes classes for moment-indeterminate probability distributions	281
Part 6. Stochastic processes	
DARYL J. DALEY AND DAVID VERE-JONES. Scoring probability forecasts for point processes: the entropy score and information gain	297
J. GANI. Random-allocation and urn models	313 321
J. F. C. KINGMAN. Extremal problems for regenerative phenomena	333
GEOFFREY PRITCHARD AND DAVID J. SCOTT. The eigenvalues of the empirical transition matrix of a Markov chain	347
VICTOR SOLO. Averaging analysis of a point process adaptive algorithm	361
Part 7. Time series analysis	
PETER J. BROCKWELL. Representations of continuous-time ARMA processes	375
WEN DAI. Asymptotics of the sample mean and sample covariance of long-range-dependent series	383
SHUANGZHE LIU. On diagnostics in conditionally heteroskedastic time series models under elliptical distributions	393
Contributors	407
Index	411