

# PROBABILITY, STATISTICS AND SEISMOLOGY

A Festschrift for  
David Vere-Jones

Edited by  
Daryl J Daley

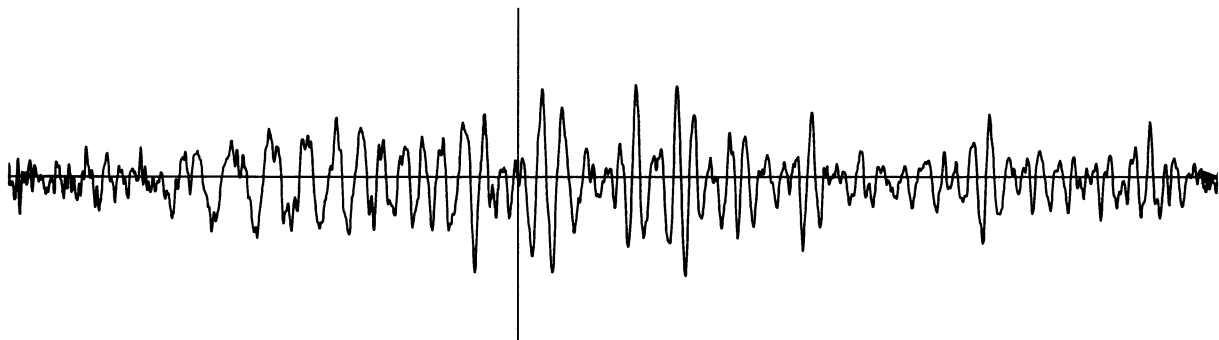
Assisted by  
Peter J Thomson  
and Yoshihiko Ogata

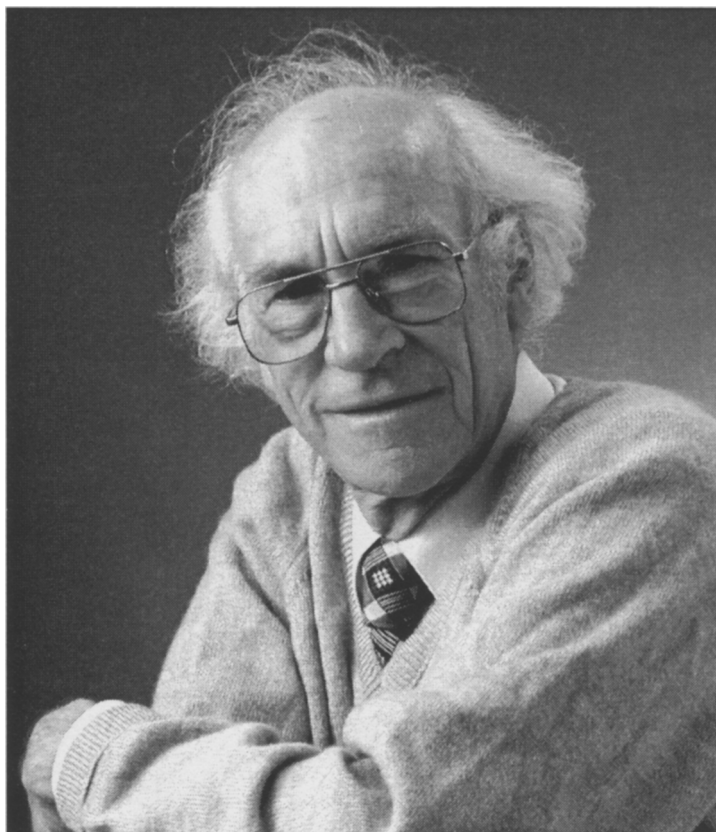


JOURNAL OF APPLIED PROBABILITY  
SPECIAL VOLUME 38A (2001)



# PROBABILITY, STATISTICS AND SEISMOLOGY





# PROBABILITY, STATISTICS AND SEISMOLOGY

**A Festschrift for**  
David Vere-Jones

**Edited by**  
Daryl J. Daley

**Assisted by**  
Peter J. Thomson  
and Yoshihiko Ogata



JOURNAL OF APPLIED PROBABILITY  
SPECIAL VOLUME 38A (2001)

Published and distributed by  
Applied Probability Trust  
School of Mathematics and Statistics  
University of Sheffield  
Sheffield S3 7RH  
UK  
<http://www.appliedprobability.org>

© Applied Probability Trust 2001

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. 0021-9002/01/\$0.70 + 0.20

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

ISBN 0-902016-06-7

ISSN 0021-9002

Printed at the Pear Tree Press, Stevenage, Herts, UK

*Cover and halftitle:* Seismographic trace courtesy of Brian Kennett, Research School of Earth Sciences, The Australian National University, Canberra

*Frontispiece:* Les Maiden, Image Services, Victoria University of Wellington

# CONTENTS

Publications of David Vere-Jones . . . . .	ix
--	----

## Biography and education

DAVID VERE-JONES. The marriage of statistics and seismology . . . . .	1
BRIAN PHILLIPS. David Vere-Jones's influence on statistical education . . . . .	6
K. G. RUSSELL. The teaching of statistical consulting . . . . .	20

## Probability theory

K. R. PARTHASARATHY. An inducing construction of quantum codes from classical error correcting codes . . . . .	27
D. J. DALEY. The moment index of minima . . . . .	33

## Markov chains

GARETH. O. ROBERTS AND RICHARD. L. TWEEDIE. Geometric $L^2$ and $L^1$ convergence are equivalent for reversible Markov chains . . . . .	37
E. SENETA. Characterization by orthogonal polynomial systems of finite Markov chains . . . . .	42
P. K. POLLETT. Similar Markov chains . . . . .	53
ALBRECHT IRLE AND JOSEPH GANI. The detection of words and an ordering for Markov chains . . . . .	66

## Time series analysis

TOHRU OZAKI AND MITSUNORI IINO. An innovation approach to non-Gaussian time series analysis . . . . .	78
RICHARD A. DAVIS AND THOMAS MIKOSCH. Point process convergence of stochastic volatility processes with application to sample autocorrelation . . . . .	93
ROBERT B. DAVIES. Integrated processes and the discrete cosine transform . . . . .	105

## Estimation problems

ALI S. DABYE AND YURY A. KUTOYANTS. Misspecified change-point estimation problem for a Poisson process . . . . .	122
A. V. NAGAEV. An asymptotic formula for the Bayes risk in discriminating between two Markov chains . . . . .	131
JOHN SANSOM AND PETER THOMSON. Fitting hidden semi-Markov models to breakpoint rainfall data . . . . .	142

### Models and statistics in seismology

Y. Y. KAGAN AND F. SCHOENBERG. Estimation of the upper cutoff parameter for the tapered Pareto distribution . . . . .	158
MARK BEBBINGTON AND DAVID S. HARTE. On the statistics of the linked stress release model . . . . .	176
DAVID R. BRILLINGER, CHANG CHIANN, RAFAEL A. IRIZARRY AND PEDRO A. MORETTIN. Automatic methods for generating seismic intensity maps . . . . .	188
YOSHIHIKO OGATA. Exploratory analysis of earthquake clusters by likelihood-based trigger models . . . . .	202
LI MA AND JIANCANG ZHUANG. Relative quiescence within the Jiashi swarm in Xinjiang, China: an application of the ETAS point process model	213
YAOLIN SHI, JIE LIU AND GUOMIN ZHANG. An evaluation of Chinese annual earthquake predictions, 1990–1998 . . . . .	222
MASAJIRO IMOTO. Point process modelling of reservoir-induced seismicity .	232

### Other stochastic models

PETER WHITTLE. On the structure of proper Black–Scholes formulae . . . .	243
JULIAN HERBERT AND VALERIE ISHAM. A study of the role of the transmission mechanism in macroparasite aggregation . . . . .	249
YONGLU DENG AND JIQING TAN. Priority queueing model with changeover times and switching threshold . . . . .	263
XIAOGU ZHENG AND JAMES RENWICK. Estimating interannual variability arising from weather events . . . . .	274
Index . . . . .	289