Highly Structured Stochastic Systems (HSSS) is a modern strategy for building statistical models for real-world problems, for computing with them, and for interpreting the resulting inferences. Complexity is handled by working up from simple local assumptions in a coherent way, and that is the key to modelling, computation, inference and interpretation; the unifying framework is that of Bayesian hierarchical models. The aim of this book is to make recent developments in HSSS accessible to a general statistical audience.

Graphical modelling and Markov chain Monte Carlo (MCMC) methodology are central to the field, and in this text they are treated in depth. These underlying methodologies are balanced by substantive areas of application: to spatial statistics in epidemiology, ecology and image analysis; to genetics; and to infectious disease modelling. The book concludes with two topics (model criticism and Bayesian nonparametrics) that seek to challenge the parametric assumptions that otherwise underlie most HSSS models.

For each of the 15 topics in the book, there is a substantial article by a leading author in the field, and two invited commentaries that complement, extend, and discuss the topic, and should be read in parallel. All authors are distinguished researchers in the field, and were active participants in an international research programme on HSSS.

ALSO AVAILABLE FROM OXFORD UNIVERSITY PRESS

Graphical models
Steffen L. Lauritzen

Neural networks for pattern recognition
Christopher M. Bishop

Statistical models in epidemiology
David Clayton and Michael Hills

Analysis of longitudinal data: Second Edition
Peter Diggle, Patrick Heagerty, Kung-Yee Liang, and Scott Zeger

Models for repeated measurements: Second Edition
J. K. Lindsey

OXFORD
UNIVERSITY PRESS

www.oup.com

ISBN 0-19-851055-1

9 780198 510550

OXFORD

Green, Hjort and Richardson

Highly Structured Stochastic Systems

Highly Structured Stochastic Systems

Edited by

Peter J. Green

Nils Lid Hjort

and

Sylvia Richardson