



# Probabilistic Networks and Expert Systems: Exact Computational Methods for Bayesian Networks (Information Science and Statistics)

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Probabilistic expert systems are graphical networks which support the modeling of uncertainty and decisions in large complex domains, while retaining ease of calculation. Building on original research by the authors, this book gives a thorough and rigorous mathematical treatment of the underlying ideas, structures, and algorithms. The book will be of interest to researchers in both artificial intelligence and statistics, who desire an introduction to this fascinating and rapidly developing field. The book, winner of the DeGroot Prize 2002, the only book prize in the field of statistics, is new in paperback.

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### Review

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"This important book fills a void in the graphical Markov models literature. The authors have summarized their extensive and influential work in this area and provided a valuable resource both for educators and for practitioners."

### From the Back Cover

Winner of the 2002 DeGroot Prize.

Probabilistic expert systems are graphical networks that support the modelling of uncertainty and decisions in large complex domains, while retaining ease of calculation. Building on original research by the authors over a number of years, this book gives a thorough and rigorous mathematical treatment of the underlying ideas, structures, and algorithms, emphasizing those cases in which exact answers are obtainable. It covers both the updating of probabilistic uncertainty in the light of new evidence, and statistical inference, about unknown probabilities or unknown model structure, in the light of new data. The careful attention to detail will make this work an important reference source for all those involved in the theory and applications of probabilistic expert systems.

This book was awarded the first DeGroot Prize by the International Society for Bayesian Analysis for a book making an important, timely, thorough, and notably original contribution to the statistics literature.

Robert G. Cowell is a Lecturer in the Faculty of Actuarial Science and Insurance of the Sir John Cass Business School, City of London. He has been working on probabilistic expert systems since 1989.

A. Philip Dawid is Professor of Statistics at Cambridge University. He has served as Editor of the *Journal of the Royal Statistical Society* (Series B), *Biometrika* and *Bayesian Analysis*, and as President of the International Society for Bayesian Analysis. He holds the Royal Statistical Society Guy Medal in Bronze and in Silver, and the Snedecor Award for the Best Publication in Biometry.

Steffen L. Lauritzen is Professor of Statistics at the University of Oxford. He has served as Editor of the *Scandinavian Journal of Statistics*. He holds the Royal Statistical Society Guy Medal in Silver and is an Honorary Fellow of the same society. He has, jointly with David J. Spiegelhalter, received the American Statistical Association's award for an "Outstanding Statistical Application."

David J. Spiegelhalter is Winton Professor of the Public Understanding of Risk at Cambridge University and Senior Scientist in the MRC Biostatistics Unit, Cambridge. He has published extensively on Bayesian methodology and applications, and holds the Royal Statistical Society Guy Medal in Bronze and in Silver.

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