MATHEMATICAL AND STATISTICAL METHODS IN RELIABILITY

Bo H. Lindqvist Kjell A. Doksum Editors

CONTENTS

PREFACE		xi
CONTRIBUTORS		xv
I	RELIABILITY THEORY IN THE PAST AND PRESENT CENTURIES	1
1	MATHEMATICAL RELIABILITY THEORY: FROM THE BEGINNING TO THE PRESENT TIME Richard E. Barlow	3
2	RELIABILITY FOR THE 21ST CENTURY Sallie A. Keller-McNulty and Alyson G. Wilson	15
II	GENERAL ASPECTS OF RELIABILITY MODELLING	31
3	ON THE USE OF MODELS AND PARAMETERS IN A BAYESIAN SETTING <i>Terje Aven</i>	33
4	CAUSAL INFLUENCE COEFFICIENTS: A LOCALISED MAXIMUM ENTROPY APPROACH TO BAYESIAN INFERENCE Michael Ingleby and Margaret West	45
5	SUBJECTIVE RELIABILITY ANALYSIS USING PREDICTIVE ELICITATION David F. Percy	57
6	COPULAE AND THEIR USES Carlo Sempi	73
III	RELIABILITY OF NETWORKS AND SYSTEMS	87
7	LINKING DOMINATIONS AND SIGNATURES IN NETWORK RELIABILITY THEORY Philip J. Boland, F.J. Samaniego and E. M. Vestrup	89

8	IMPROVED SIMULATION METHODS FOR SYSTEM RELIABILITY EVALUATION Arne Bang Huseby and Morten Naustdal	105
9	RELIABILITY OF MULTI-STATE SYSTEMS: A HISTORICAL OVERVIEW Gregory Levitin, Anatoly Lisnianski and Igor Ushakov	123
IV	STOCHASTIC MODELLING AND OPTIMIZATION IN RELIABILITY	139
10	WAITING TIMES ASSOCIATED WITH THE SUM OF SUCCESS RUN LENGTHS D.L. Antzoulakos, S. Bersimis and M.V. Koutras	141
11	MAXIMUM LIKELIHOOD PREDICTION OF FUTURE RECORD STATISTIC Prasanta Basak and N. Balakrishnan	159
12	DETECTING CHANGE POINTS ON DIFFERENT INFORMATION LEVELS Tina Herberts and Uwe Jensen	177
13	THE RELIABILITY OF QUADRATIC DYNAMIC SYSTEMS Arvid Naess	193
14	INSPECTION AND MAINTENANCE FOR STOCHASTICALLY DETERIORATING SYSTEMS Martin Newby and Richard Dagg	201
V	MODELLING IN SURVIVAL AND RELIABILITY ANALYSIS	219
15	A LOOK BEHIND SURVIVAL DATA: UNDERLYING PROCESSES AND QUASI-STATIONARITY Odd O. Aalen and Håkon K. Gjessing	221
16	ON SOME PROPERTIES OF DEPENDENCE AND AGING FOR RESIDUAL LIFETIMES IN THE EXCHANGEABLE CASE	
	Bruno Bassan and Fabio Spizzichino	235

17	EFFICIENT COMPUTATIONAL TECHNIQUES FOR POWER SYSTEMS RELIABILITY ASSESSMENT Dumitru Cezar Ionescu, Paul Ulmeanu, Adrian Constantinescu and Ioan Rotaru	251
18	PREDICTING DAMAGE Nozer D. Singpurwalla, Chungwai Kong and Andrew Swift	267
19	WEIBULL-RELATED DISTRIBUTIONS FOR THE MODELLING OF BATHTUB SHAPED FAILURE RATE FUNCTIONS	
	M. Xie, C.D. Lai and D.N.P. Murthy	283
VI	STATISTICAL METHODS FOR DEGRADATION DATA	299
20	ESTIMATION FROM SIMULTANEOUS DEGRADATION AND FAILURE TIME DATA V. Bagdonavicius, A.Bikelis, V. Kazakevicius and M. Nikulin	301
21	ACCELERATED DESTRUCTIVE DEGRADATION TESTS: DATA, MODELS, AND ANALYSIS Luis A. Escobar, William Q. Meeker, Danny L. Kugler and Laura L. Kramer	319
VII	STATISTICAL METHODS FOR MAINTAINED SYSTEMS	339
22	MODELLING HETEROGENEITY IN NUCLEAR POWER PLANT VALVE FAILURE DATA Madhuchhanda Bhattacharjee, Elja Arjas and Urho Pulkkinen	341
23	COMPETING RISK PERSPECTIVE ON RELIABILITY DATABASES Cornel Bunea, Roger Cooke and Bo Henry Lindqvist	355
24	STOCHASTIC MODELLING OF THE JOINT EFFECT OF PREVENTIVE AND CORRECTIVE MAINTENANCE ON REPAIRABLE SYSTEMS RELIABILITY	0.51
	Laurent Doyen and Olivier Gaudoin	371

25	MODELING THE INFLUENCE OF MAINTENANCE ACTIONS Waltraud Kahle and Charles E. Love	387
26	A CLASS OF TESTS FOR RENEWAL PROCESS VERSUS MONOTONIC AND NONMONOTONIC TREND IN REPAIRABLE SYSTEMS DATA Jan Terje Kvaløy and Bo Henry Lindqvist	401
27	A MAINTENANCE MODEL FOR COMPONENTS EXPOSED TO SEVERAL FAILURE MECHANISMS AND IMPERFECT REPAIR Helge Langseth and Bo Henry Lindqvist	415
VIII	STATISTICAL INFERENCE IN SURVIVAL ANALYSIS	431
28	EMPIRICAL PLUG-IN CURVE AND SURFACE ESTIMATES	
	Jiancheng Jiang and Kjell Doksum	433
29	SOME EXACT AND APPROXIMATE CONFIDENCE REGIONS FOR THE RATIO OF PERCENTILES FROM TWO DIFFERENT DISTRIBUTIONS <i>Richard Johnson and Li-Fei Huang</i>	455
30	EMPIRICAL ESTIMATORS OF RELIABILITY AND RELATED FUNCTIONS FOR SEMI-MARKOV SYSTEMS Nikolaos Limnios and Brahim Ouhbi	469
31	CLASSES OF FIXED-ORDER AND ADAPTIVE SMOOTH GOODNESS-OF-FIT TESTS WITH DISCRETE BIGTH-CENSORED DATA	
	Edsel A. Peña	485
IX	SOFTWARE RELIABILITY METHODS	503
32	THEORETICAL AND PRACTICAL CHALLENGES IN SOFTWARE RELIABILITY AND TESTING	
	Philip J. Boland, Santos Faundez Sekirkin and Harshinder Singh	505

33	ON THE ASYMPTOTIC ANALYSIS OF LITTLEWOOD'S RELIABILITY MODEL FOR MODULAR SOFTWARE James Ledoux	521
34	ADAPTIVE METHODS UNDER PREDICTION MODELS FOR SOFTWARE RELIABILITY Shelemyahu Zacks	537