

# Contents

## VOLUME 1

Absolute Risk Reduction	1	Bonus–Malus Systems	165
Accelerated Life Testing	2	Burn-in Testing: Its Quantification and Applications	170
Actuary	8	1,3-Butadiene	176
Adverse Selection	14	Cancer Risk Evaluation from Animal Studies	181
Air Pollution Risk	15	Canonical Modeling	189
Alternative Risk Transfer	21	Case–Control Studies	192
Arsenic	28	Causal Diagrams	205
As Low as Reasonably Practicable/ As Low as Reasonably Achievable	38	Causality/Causation	211
Asbestos	43	Censoring	221
Assessment of Risk Association with Beryllium Exposure	52	Change Point Analysis	225
Asset–Liability Management for Life Insurers	60	Chernobyl Nuclear Disaster	227
Asset–Liability Management for Nonlife Insurers	63	Clinical Dose–Response Assessment	233
Association Analysis	67	Coding: Statistical Data Masking Techniques	240
Attributable Fraction and Probability of Causation	73	Cohort Studies	243
Availability and Maintainability	77	Collective Risk Models	255
Axiomatic Measures of Risk and Risk-Value Models	84	Combining Information	259
Axiomatic Models of Perceived Risk	94	Common Cause Failure Modeling	264
Basic Concepts of Insurance	105	Comonotonicity	274
Bayes' Theorem and Updating of Belief	107	Comparative Efficacy Trials (Phase III Studies)	279
Bayesian Analysis and Markov Chain Monte Carlo Simulation	111	Comparative Risk Assessment	283
Bayesian Statistics in Quantitative Risk Assessment	119	Compensation for Loss of Life and Limb	292
Behavioral Decision Studies	136	Competing Risks	301
Benchmark Analysis	145	Competing Risks in Reliability	307
Benchmark Dose Estimation	149	Compliance with Treatment Allocation	312
Benzene	154	Computer Security: A Historical Perspective	321
Bioequivalence	159	Condition Monitoring	341
Blinding	163	Conflicts, Choices, and Solutions: Informing Risky Choices	346
		Confounding	353
		Considerations in Planning for Successful Risk Communication	362
		Continuous-Time Asset Allocation	366

Copulas and Other Measures of		Environmental Health Risk	574
Dependency	372	Environmental Health Risk	
Correlated Risk	374	Assessment	580
Cost-Effectiveness Analysis	375	Environmental Health Triage,	
Counterterrorism	387	Chemical Risk Assessment for	589
Credibility Theory	390	Environmental Monitoring	591
Credit Migration Matrices	401	Environmental Performance Index	602
Credit Risk Models	407	Environmental Remediation	606
Credit Scoring <i>via</i> Altman Z-Score	412	Environmental Risk Assessment	
Credit Value at Risk	416	of Water Pollution	611
Cross-Species Extrapolation	419	Environmental Risk Regulation	613
Cumulative Risk Assessment for		Environmental Risks	617
Environmental Hazards	425	Environmental Security	622
Cyber Risk Management	429	Environmental Tobacco Smoke	627
		Epidemiology as Legal Evidence	630
		Equity-Linked Life Insurance	637
<b>VOLUME 2</b>		Estimation of Mortality Rates from	
Data Fusion	441	Insurance Data	643
Decision Analysis	447	Ethical Issues in Using Statistics,	
Decision Conferencing/Facilitated		Statistical Methods, and Statistical	
Workshops	451	Sources in Work Related	
Decision Modeling	459	to Homeland Security	647
Decision Trees	462	Evaluation of Risk Communication	
Default Correlation	470	Efforts	650
Default Risk	476	Experience Feedback	656
Degradation and Shock Models	481	Expert Elicitation for Risk	
Dependent Insurance Risks	489	Assessment	661
Design of Reliability Tests	493	Expert Judgment	667
Detection Limits	498	Extreme Event Risk	676
Digital Governance, Hotspot		Extreme Value Theory in Finance	678
Detection, and Homeland		Extreme Values in Reliability	686
Security	502	Extremely Low Frequency Electric	
Dioxin Risk	510	and Magnetic Fields	691
Disease Mapping	513		
Distributions for Loss Modeling	516	Failure Modes and Effects Analysis	695
Dose-Response Analysis	523	Fair Value of Insurance Liabilities	700
Dynamic Financial Analysis	528	Fate and Transport Models	705
		Fault Detection and Diagnosis	714
Early Warning Systems (EWSs) for		Federal Statistical Systems as Data	
Predicting Financial Crisis	535	Sources for Intelligence, Investigative,	
Ecological Risk Assessment	539	or Prosecutorial Work	718
Economic Criteria for Setting		Fraud in Insurance	723
Environmental Standards	542	From Basel II to Solvency II – Risk	
Effect Modification and Interaction	553	Management in the Insurance	
Efficacy	556	Sector	727
Engineered Nanomaterials	558		
Enterprise Risk Management (ERM)	559	Game Theoretic Methods	733
Environmental Carcinogenesis Risk	566	Gene-Environment Interaction	737
Environmental Exposure Monitoring	567	Geographic Disease Risk	744
Environmental Hazard	572	Global Warming	748



Group Decision	760	Managing Foodborne Risk	1029
Hazard and Hazard Ratio	771	Managing Infrastructure Reliability, Safety, and Security	1033
Hazardous Waste Site(s)	777	Managing Risks of Consumer Products	1040
Hazards Insurance: A Brief History	784	Markov Modeling in Reliability	1045
Health Hazards Posed by Dioxin	786	Mathematical Models of Credit Risk	1049
Hexavalent Chromium	796	Mathematics of Risk and Reliability: A Select History	1054
History and Examples of Environmental Justice	808	Mercury/Methylmercury Risk	1062
History of Epidemiologic Studies	817	Meta-Analysis in Clinical Risk Assessment	1064
Homeland Security and Transportation Risk	830	Meta-Analysis in Nonclinical Risk Assessment	1075
Hormesis	838	Methylmercury	1084
Hotspot Geoinformatics	844	Microarray Analysis	1089
Human Reliability Assessment	851	Mobile Phones and Health Risks	1092
		Model Risk	1094
Imprecise Reliability	875	Modifiable Areal Unit Problem (MAUP)	1098
Individual Risk Models	881	Molecular Markers and Models	1101
Inequalities in Risk Theory	888	Monte Carlo Methods	1104
Inferiority and Superiority Trials	895	Moral Hazard	1107
Influence Diagrams	897	Multiaattribute Modeling	1109
Informational Value of Corporate Issuer Credit Ratings	910	Multiaattribute Utility Functions	1114
Insurability Conditions	915	Multiaattribute Value Functions	1119
Insurance Applications of Life Tables	916	Multistate Models for Life Insurance Mathematics	1128
Insurance Pricing/Nonlife	922	Multistate Systems	1139
Integration of Risk Types	933	Multivariate Reliability Models and Methods	1144
Intensity Modeling: The Cox Process	937		
Intent-to-Treat Principle	940	Natural Resource Management	1149
Interpretations of Probability	943	Near-Miss Management: A Participative Approach to Improving System Reliability	1154
		No Fault Found	1163
<b>VOLUME 3</b>		Non- and Semiparametric Models and Inference for Reliability Systems	1167
Kriging	953	Nonlife Insurance Markets	1176
Large Insurance Losses Distributions	961	Nonlife Loss Reserving	1180
Latin Hypercube Sampling	969	Nonparametric Calibration of Derivatives Models	1187
Lead	973	Nuclear Explosion Monitoring	1191
Lévy Processes in Asset Pricing	978	Numerical Schemes for Stochastic Differential Equation Models	1197
Life Insurance Markets	983		
Lifetime Models and Risk Assessment	987	Occupational Cohort Studies	1203
Linkage Analysis	991	Occupational Risks	1214
Logistic Regression	1003		
Longevity Risk and Life Annuities	1014		
Low-Dose Extrapolation	1019		
Maintenance Modeling and Management	1023		

Odds and Odds Ratio	1219	Randomized Controlled Trials	1415
Operational Risk Development	1220	Recurrent Event Data	1419
Operational Risk Modeling	1224	Reinsurance	1425
Optimal Risk-Sharing and		Relative Risk	1429
Deductibles in Insurance	1230	Reliability Data	1430
Optimal Stopping and Dynamic		Reliability Demonstration	1438
Programming	1236	Reliability Growth Testing	1443
Options and Guarantees in Life		Reliability Integrated Engineering	
Insurance	1244	Using Physics of Failure	1448
Ordering of Insurance Risk	1250	Reliability of Consumer Goods with	
		"Fast Turn Around"	1462
Parametric Probability Distributions		Reliability of Large Systems	1466
in Reliability	1255	Reliability Optimization	1471
Persistent Organic Pollutants	1261	Remote Sensing	1477
Pesticide Risk	1271	Repair, Inspection, and Replacement	
Pharmaceuticals in the Environment	1273	Models	1481
Players in a Decision	1277	Repairable Systems Reliability	1493
Point Source Modeling	1278	Repeated Measures Analyses	1500
Polychlorinated Biphenyls	1281	Risk and the Media	1508
Potency Estimation	1285	Risk Attitude	1512
Precautionary Principle	1290	Risk Characterization	1524
Precautionary Principles: Definitions,		Risk Classification in Nonlife	
Issues, and Implications		Insurance	1530
for Risky Choices	1293	Risk Classification/Life	1535
Premium Calculation and Insurance		Risk from Ionizing Radiation	1540
Pricing	1302	Risk in Credit Granting and Lending	
Pricing of Life Insurance Liabilities	1314	Decisions: Credit Scoring	1546
Privacy Protection in an Era of Data		Risk Management of Construction	
Mining and Record Keeping	1322	Defects	1553
Probabilistic Design	1325	Risk Measures and Economic Capital	
Probabilistic Risk Assessment	1349	for (Re)insurers	1556
Product Risk Management: Testing		Risk-Benefit Analysis for	
and Warranties	1356	Environmental Applications	1566
Professional Organizations in Risk		Risk-Neutral Pricing: Importance and	
Management	1360	Relevance	1569
Protection of Infrastructure	1364	Role of Alternative Assets	
Public Health Surveillance	1371	in Portfolio Construction	1574
Public Participation	1381	Role of Risk Communication in a	
		Comprehensive Risk Management	
Quantitative Reliability Assessment		Approach	1584
of Electricity Supply	1393	Ruin Probabilities: Computational	
		Aspects	1587
<b>VOLUME 4</b>		Ruin Theory	1591
R&D Planning and Risk		Safety	1599
Management	1399	Sampling and Inspection for	
Radioactive Chemicals/Radioactive		Monitoring Threats to	
Compounds	1403	Homeland Security	1600
Radon	1409	Scenario Simulation Method for	
Radon Risk	1411	Risk Management	1603



Scenario-Based Risk Management and Simulation Optimization	1611	Threshold Models	1769
Scientific Uncertainty in Social Debates Around Risk	1618	Toxic Torts: Implications for Risk Management	1771
Securitization/Life	1623	Toxicity (Adverse Events)	1777
Simulation in Risk Management	1627	Truncation	1779
Social Networks	1634	Ultrahigh Reliability	1783
Societal Decision Making	1640	Uncertainty Analysis and Dependence Modeling	1789
Software Testing and Reliability	1642	Uncertainty and Variability Characterization and Measures in Risk Assessment	1797
Soil Contamination Risk	1653	Understanding Large-Scale Structure in Massive Data Sets	1804
Solvency	1657	Use of Decision Support Techniques for Information System Risk Management	1811
Spatial Risk Assessment	1663	Utility Function	1818
Spatiotemporal Risk Analysis	1665	Value at Risk (VaR) and Risk Measures	1823
Stakeholder Participation in Risk Management Decision Making	1668	Value Function	1830
Statistical Arbitrage	1672	Volatility Modeling	1832
Statistics for Environmental Justice	1678	Volatility Smile	1839
Statistics for Environmental Mutagenesis	1682	Vulnerability Analysis for Environmental Hazards	1845
Statistics for Environmental Teratogenesis	1687	Warranty Analysis	1849
Statistics for Environmental Toxicity	1692	Water Pollution Risk	1857
Stochastic Control for Insurance Companies	1697	Wear	1862
Stratospheric Ozone Depletion	1702	Weather Derivatives	1868
Stress Screening	1704	What are Hazardous Materials?	1873
Structural Models of Corporate Credit Risk	1707	Zero Failure Data	1879
Structural Reliability	1712		
Structured Products and Hybrid Securities	1715		
Subjective Expected Utility	1719		
Subjective Probability	1724		
Supra Decision Maker	1734		
Survival Analysis	1736		
Syndromic Surveillance	1743		
Systems Reliability	1753		