1. Record Nr. UNINA9910254830203321

Titolo	Guide to Computational Modelling for Decision Processes : Theory, Algorithms, Techniques and Applications / / edited by Stuart Berry, Val Lowndes, Marcello Trovati
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-55417-4
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XII, 396 p. 170 illus., 101 illus. in color.)
Collana	Simulation Foundations, Methods and Applications, , 2195-2825
Disciplina	004
Soggetti	Computer simulation Algorithms Operations research Mathematics Computer science - Mathematics Mathematical statistics Computer Modelling Operations Research and Decision Theory Applications of Mathematics Probability and Statistics in Computer Science
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Part I: Introduction to Modelling and Model Evaluation -- Model Building -- Introduction to Cellular Automata in Simulation -- Introduction to Mathematical Programming -- Heuristic Techniques in Optimisation -- Introduction to the Use of Queueing Theory and Simulation -- Part II: Case Studies -- Case Studies: Using Heuristics -- Further Use of Heuristic Methods -- Air Traffic Controllers Planning: A Rostering Problem -- Solving Multiple Objective Problems: Modelling Diet Problems -- Fuzzy Scheduling Applied to Small Manufacturing Firms -- The Design and Optimisation of Surround Sound Decoders Using Heuristic Methods -- System Dynamics Case Studies -- Applying Queueing Theory to the Design of a Traffic Light Controller -- Cellular Automata and Agents in Simulations -- Three Big Data Case Studies --

Part III: Appendices -- Appendix A: Queueing Theory -- Appendix B: Function Optimisation Techniques: Genetic Algorithms and Tabu Searches -- Appendix C: What to Simulate to Evaluate Production Planning and Control Methods in Small Manufacturing Firms -- Appendix D: Defining Boolean and Fuzzy Logic Operators -- Appendix E: Assessing the Reinstated Waverley Line -- Appendix F: Matching Services with Users in Opportunistic Network Environments.

Sommario/riassunto

This interdisciplinary reference and guide provides an introduction to modelling methodologies and models which form the starting point for deriving efficient and effective solution techniques, and presents a series of case studies that demonstrate how heuristic and analytical approaches may be used to solve large and complex problems. Topics and features: Introduces the key modelling methods and tools, including heuristic and mathematical programming-based models, and queuing theory and simulation techniques Demonstrates the use of heuristic methods to not only solve complex decision-making problems, but also to derive a simpler solution technique Presents case studies on a broad range of applications that make use of techniques from genetic algorithms and fuzzy logic, tabu search, and queuing theory Reviews examples incorporating system dynamics modelling, cellular automata and agent-based simulations, and the use of big data Contains appendices covering queuing theory, function optimization techniques, Boolean and fuzzy logic, and transport modelling Describes simulation for the evaluation of production planning and control methods, and a model for matching services with users in opportunistic network environments Researchers, practitioners and students in computer science, engineering and business studies will find this work to be an invaluable and in-depth introduction to the use of simulation techniques in the analysis of large and complex problems, in addition to providing an exhaustive description of the theoretical framework and applications being developed to address such problems. .