

1. Record Nr.	UNINA9910877377103321
Titolo	Formal methods for industrial critical systems : a survey of applications / edited by Stefania Gnesi, Tiziana Margaria
Pubbl/distr/stampa	Hoboken, N.J., : John Wiley & Sons Inc., c2013
ISBN	1-118-45989-X 1-283-85888-6 1-118-45986-5
Descrizione fisica	1 online resource (294 p.)
Classificazione	COM059000
Altri autori (Persone)	GnesiStefania <1954-> Margaria-SteffenTiziana <1964->
Disciplina	004.21 620.86028551
Soggetti	Formal methods (Computer science) System design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	FOREWORD by Mike Hinchey xiii -- FOREWORD by Alessandro Fantechi and Pedro Merino xv -- PREFACE xvii -- CONTRIBUTORS xix -- PART I INTRODUCTION AND STATE OF THE ART 1 -- 1 FORMAL METHODS: APPLYING {LOGICS IN, THEORETICAL} COMPUTER SCIENCE 3 -- Diego Latella -- 1.1 Introduction and State of the Art 3 -- 1.2 Future Directions 9 -- PART II MODELING PARADIGMS 15 -- 2 A SYNCHRONOUS LANGUAGE AT WORK: THE STORY OF LUSTRE 17 -- Nicolas Halbwachs -- 2.1 Introduction 17 -- 2.2 A Flavor of the Language 18 -- 2.3 The Design and Development of Lustre and Scade 20 -- 2.4 Some Lessons from Industrial Use 25 -- 2.5 And Now . . . 28 -- 3 REQUIREMENTS OF AN INTEGRATED FORMAL METHOD FOR INTELLIGENT SWARMS 33 -- Mike Hinchey, James L. Rash, Christopher A. Rouff, Walt F. Truszkowski, and Amy K.C.S. Vanderbilt -- 3.1 Introduction 33 -- 3.2 Swarm Technologies 35 -- 3.3 NASA FAST Project 39 -- 3.4 Integrated Swarm Formal Method 41 -- 3.5 Conclusion 55 -- PART III TRANSPORTATION SYSTEMS 61 -- 4 SOME TRENDS IN FORMAL METHODS APPLICATIONS TO RAILWAY SIGNALING 63 -- Alessandro Fantechi, Wan Fokkink, and Angelo Morzenti -- 4.1

Introduction 63 -- 4.2 CENELEC Guidelines 65 -- 4.3 Software Procurement in Railway Signaling 66 -- 4.4 A Success Story: The B Method 70 -- 4.5 Classes of Railway Signaling Equipment 71 -- 4.6 Conclusions 80 -- 5 SYMBOLIC MODEL CHECKING FOR AVIONICS 85 -- Radu I. Siminiceanu and Gianfranco Ciardo -- 5.1 Introduction 85 -- 5.2 Application: The Runway Safety Monitor 87 -- 5.3 A Discrete Model of RSM 95 -- 5.4 Discussion 107 -- PART IV TELECOMMUNICATIONS 113 -- 6 APPLYING FORMAL METHODS TO TELECOMMUNICATION SERVICES WITH ACTIVE NETWORKS 115 -- María del Mar Gallardo, Jesus Martínez, and Pedro Merino -- 6.1 Overview 115 -- 6.2 Active Networks 116 -- 6.3 The Capsule Approach 117 -- 6.4 Previous Approaches on Analyzing Active Networks 118 -- 6.5 Model Checking Active Networks with SPIN 122 -- 6.6 Conclusions 129 -- 7 PRACTICAL APPLICATIONS OF PROBABILISTIC MODEL CHECKING TO COMMUNICATION PROTOCOLS 133 -- Marie Duflot, Marta Kwiatkowska, Gethin Norman, David Parker, Sylvain Peyronnet, Claudine Picaronny, and Jeremy Sproston.

7.1 Introduction 133 -- 7.2 PTAs 134 -- 7.3 Probabilistic Model Checking 136 -- 7.4 Case Study: CSMA/CD 139 -- 7.5 Discussion and Conclusion 146 -- PART V INTERNET AND ONLINE SERVICES 151 -- 8 DESIGN FOR VERIFIABILITY: THE OCS CASE STUDY 153 -- Johannes Neubauer, Tiziana Margaria, and Bernhard Steffen -- 8.1 Introduction 153 -- 8.2 The User Model 155 -- 8.3 The Models and the Framework 158 -- 8.4 Model Checking 159 -- 8.5 Validating Emerging Global Behavior via Automata Learning 161 -- 8.6 Related Work 170 -- 8.7 Conclusion and Perspectives 173 -- 9 AN APPLICATION OF STOCHASTIC MODEL CHECKING IN THE INDUSTRY: USER-CENTERED MODELING AND ANALYSIS OF COLLABORATION IN THINKTEAM 179 -- Maurice H. ter Beek, Stefania Gnesi, Diego Latella, Mieke Massink, Maurizio Sebastianis, and Gianluca Trentanni -- 9.1 Introduction 179 -- 9.2 thinkteam 182 -- 9.3 Analysis of the thinkteam Log File 184 -- 9.4 thinkteam with Replicated Vaults 189 -- 9.5 Lessons Learned 201 -- 9.6 Conclusions 201 -- PART VI RUNTIME: TESTING AND MODEL LEARNING 205 -- 10 THE TESTING AND TEST CONTROL NOTATION TTCN-3 AND ITS USE 207 -- Ina Schieferdecker and Alain-Georges Vouffo-Feudjio -- 10.1 Introduction 207 -- 10.2 The Concepts of TTCN-3 210 -- 10.3 An Introductory Example 216 -- 10.4 TTCN-3 Semantics and Its Application 219 -- 10.5 A Distributed Test Platform for the TTCN-3 220 -- 10.6 Case Study I: Testing of Open Service Architecture (OSA)/Parlay Services 223 -- 10.7 Case Study II: Testing of IP Multimedia Subsystem (IMS) Equipment 225 -- 10.8 Conclusion 230 -- 11 PRACTICAL ASPECTS OF ACTIVE AUTOMATA LEARNING 235 -- Falk Howar, Maik Merten, Bernhard Steffen, and Tiziana Margaria -- 11.1 Introduction 235 -- 11.2 Regular Extrapolation 239 -- 11.3 Challenges in Regular Extrapolation 244 -- 11.4 Interacting with Real Systems 247 -- 11.5 Membership Queries 250 -- 11.6 Reset 253 -- 11.7 Parameters and Value Domains 256 -- 11.8 The NGLL 260 -- 11.9 Conclusion and Perspectives 263 -- References 264 -- INDEX 269.

---

Sommario/riassunto

"Balances leading edge material, established practice, and reviews of historically important contributions"--

---