1.	Record Nr.	UNINA9910299049903321
	Titolo	Collaborative Design for Embedded Systems : Co-modelling and Co-simulation / / edited by John Fitzgerald, Peter Gorm Larsen, Marcel Verhoef
	Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2014
	ISBN	3-642-54118-6
	Edizione	[1st ed. 2014.]
	Descrizione fisica	1 online resource (393 p.)
	Disciplina	003.3 004 004.6 005.1
	Soggetti	Special purpose computers Software engineering Computer logic Computer simulation Computer engineering Electronic circuits Special Purpose and Application-Based Systems Software Engineering Logics and Meanings of Programs Simulation and Modeling Computer Engineering Circuits and Systems
	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	Part I Co-modelling and Co-simulation: the Technical Basis -- Collaborative Development of Embedded Systems -- Co-modelling and Co-simulation in Embedded Systems Design -- Continuous-Time Modelling in 20-sim -- Discrete-Event Modelling in VDM -- Support for Co-modelling and Co-simulation: the Crescendo Tool -- Co-model Structuring and Design Patterns -- Part II Methods and Applications:

the Pragmatics of Co-modelling and Co-simulation -- Case Studies in Co-modelling and Co-simulation -- Methods for Creating Co-models of Embedded Systems -- Co-modelling of Faults and Fault Tolerance Mechanisms -- Design Space Exploration for Embedded Systems using Co-simulation -- Industrial Application of Co-modelling and Co-simulation Technology -- Part III Advanced Topics -- Deploying Co-modelling in Commercial Practice -- Semantics of Co-simulation -- From Embedded to Cyber-Physical Systems: Challenges and Future Directions -- Appendix A 20-sim Summary -- Appendix B VDM-RT Language Summary -- Appendix C Design Patterns for Use in Co-modelling -- Appendix D Abstract Modelling of ChessWay Safety.

| Sommario/riassunto | One of the most significant challenges in the development of embedded and cyber-physical systems is the gap between the disciplines of software and control engineering. In a marketplace, where rapid innovation is essential, engineers from both disciplines need to be able to explore system designs collaboratively, allocating responsibilities to software and physical elements, and analyzing trade-offs between them. To this end, this book presents a framework that allows the very different kinds of design models – discrete-event (DE) models of software and continuous time (CT) models of the physical environment – to be analyzed and simulated jointly, based on common scenarios. The individual chapters provide introductions to both sides of this co-simulation technology, and give a step-by-step guide to the methodology for designing and analyzing co-models. They are grouped into three parts: Part I introduces the technical basis for collaborative modeling and simulation with the Crescendo technology. Part II continues with different methodological guidelines for creating co-models and analyzing them in different ways using case studies. Part III then delves into more advanced topics and looks into the potential future of this technology in the area of cyber-physical systems. Finally various appendices provide summaries of the VDM and 20-sim technologies, a number of valuable design patterns applicable for co-models, and an acronym list along with indices and references to other literature. By combining descriptions of the underlying theory with records of real engineers' experience in using the framework on a series of case studies the book appeals to scientists and practitioners alike. It is complemented by tools, examples, videos, and other material on www.crescendotool.org. Scientists/researchers and graduate students working in embedded and cyber-physical systems will learn the semantic foundations for collaborative modeling and simulation, as well as the current capabilities and limitations of methods and tools in this field. Practitioners will be able to develop an appreciation of the capabilities of the co-modeling techniques, to assess the benefits of more collaborative approaches to modeling and simulation, and will benefit from the included guidelines and modeling patterns. |