

OBJECT-ORIENTED MODELING

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207 pp. ISBN 0-7923-9687-1

We hope you will enjoy reading this series. We welcome your suggestions and look forward to having you as a contributor.

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VOLUME PRESENTATION

VOLUME 7: OBJECT-ORIENTED MODELING

Object oriented techniques and languages have been proven to significantly increase engineering efficiency in software development. Many benefits are expected from their introduction into electronic modeling. Among them are better support of model reusability and flexibility, a more efficient system modeling, and more possibilities in design space exploration and prototyping. Therefore, we decided to dedicate a full CIEM issue to object oriented methods, formalisms and hardware description language extensions.

In the first chapter, *"Object orientation: modeling and design paradigms for the year 2000?"*, the author studies what has happened in software in recent years to predict a breakthrough in hardware by the end of this century. Object-Oriented techniques will be responsible for this breakthrough. Additionally, this chapter contains interesting and complete references about Object-Oriented modeling.

The second chapter, *"Object-Oriented Modeling of Hardware for Embedded Systems"*, details the potential advantages of Object-Oriented techniques when applied to hardware design. It contains many examples using C++ for hardware modeling.

"Object-Oriented and Real Time Techniques: Combined Use of OMT, SDL and MSC" is the third chapter. It shows how to use Object-Oriented techniques to address real-time issues. The presented approach involves OMT (an object-oriented analysis and design method defined in 1991 by a General Electric team led by J. Rumbaugh), SDL and MSC. SDL, Specification and Description Language, and MSC, Message Sequence Chart, are both ITU-T recommendations widespread in the telecom sector, with more than 20,000 users. The target here is to analyse, model, validate and design (in software) a real-time system.

The fourth chapter, *"Integrated System Design with an Object-Oriented Methodology"*, extends the previous approach to also encompass the hardware aspects of system design. The INSYDE methodology describes how to use a combination of OMT, SDL (for software) and VHDL (for hardware) to offer a co-simulation platform.

The last three chapters focus on the different ways to introduce Object-Oriented techniques into VHDL. The fifth and sixth chapters propose Object-Oriented extensions to the languages while the seventh one presents an Object-Oriented approach to the design.

In "*Object Orientation and Structural Design*", the fifth chapter, the structural VHDL description capabilities are detailed and compared with Object-Oriented properties. In order to allow incremental design by inheritance in VHDL, a language extension is proposed for VHDL entities, architectures and component declarations.

The sixth chapter, "*Abstract Hardware Modelling using an Object-Oriented Language Extension to VHDL*", addresses the problem of reusability of hardware. After discussing the best gain domains of reuse, the OMT method is briefly presented and Object-Oriented extensions to VHDL types are proposed to allow a good mapping between the OMT concepts and this implementation language.

Finally, the seventh chapter entitled "*Object-Oriented Generation of VHDL Models*", defines an object-oriented approach to generating a library of VHDL synthesizable models. The object-oriented analysis and implementation of the VHDL model generation system is described. An example of the VHDL code generated for a 4-bit ripple carry adder is included.

Jean-Michel Bergé, Co-Editor

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