

# Contents

## Part I: Conceptual Foundations

<i>Agent-Oriented Software Engineering: The State of the Art</i> .....	1
Michael Wooldridge and Paolo Ciancarini	
<i>Interaction-Oriented Programming</i> .....	29
Michael N. Huhns	
<i>Issues in Agent-Oriented Software Engineering</i> .....	45
Jürgen Lind	
<i>Agent-Based Software Engineering</i> .....	59
Charles Petrie	
<i>Software Architecture Attributes of Multi-agent Systems</i> .....	77
Onn Shehory	

## Part II: UML for AOSE

<i>Agent UML: A Formalism for Specifying Multiagent Software Systems</i> .....	91
Bernhard Bauer, Jörg P. Müller, and James Odell	
<i>Agent-Oriented Modeling with Graph Transformation</i> .....	105
Ralph Depke, Reiko Heckel, and Jochen Malte Küster	
<i>Representing Agent Interaction Protocols in UML</i> .....	121
James Odell, H. Van Dyke Parunak, and Bernhard Bauer	

## Part III: Methodologies for AO Analysis and Design

<i>On the Identification of Agents in the Design of Production Control Systems</i> .	141
Stefan Bussmann, Nicholas R. Jennings, and Michael Wooldridge	
<i>Agent Software Engineering with Role Modelling</i> .....	163
Elizabeth A. Kendall	
<i>Designing Agent-Oriented Systems by Analysing Agent Interactions</i> .....	171
Simon Miles, Mike Joy, and Michael Luck	
<i>SODA: Societies and Infrastructures in the Analysis and Design</i> .....	185
<i>of Agent-Based Systems</i>	
Andrea Omicini	
<i>A Modelling Approach for Agent Based Systems Design</i> .....	195
Omer F. Rana	

*An Overview of the Multiagent Systems Engineering Methodology* ..... 207  
Mark F. Wood and Scott A. DeLoach

*Security for Mobile Agents* ..... 223  
Nobukazu Yoshioka, Yasuyuki Tahara, Akihiko Ohsuga, and Shinichi Honiden

*Organizational Abstractions for the Analysis and Design of Multi-agent Systems* ..... 235  
Franco Zambonelli, Nicholas R. Jennings, and Michael Wooldridge

**Part IV: Reuse**

*Reuse and Abstraction in Verification: Agents Acting in Dynamic Environments* ..... 253  
Catholijn M. Jonker, Jan Treur, and Wieke de Vries

**Part V: Applications and Experiences**

*Strategy Selection-Based Meta-level Reasoning for Multi-agent Problem-Solving* ..... 269  
K. Suzanne Barber, David C. Han, and Tse-Hsin Liu

*Introducing the Adaptive Agent Oriented Software Architecture and Its Application in Natural Language User Interfaces* ..... 285  
Babak Hodjat and Makoto Amamiya

*Adding Extensible Synchronization Capabilities to the Agent Model of a FIPA-Compliant Agent Platform* ..... 307  
Agostino Poggi and Giovanni Rimassa

*Author Index* ..... 323