# Table of Contents

## Modelling and Design of Agent Systems

An Agent-Environment Interaction Model .......................... 1  
*Scott A. DeLoach and Jorge L. Valenzuela*

Allocating Goals to Agent Roles During MAS Requirements  
*Ivan J. Jureta, Stéphane Faulkner, and Pierre-Yves Schobbens*  
Engineering ..................................................................... 19

An Aspect-Oriented Modeling Framework for Multi-Agent Systems  
*Gustavo Carvalho, Christian Fernandez, and Pierre-Yves Schobbens*  
Design ............................................................................. 35  
*Alessandro Garcia, Cristina Chavez, and Ricardo Choren*

## Modelling Open Agent Systems

Extending UML Sequence Diagrams to Model Agent Mobility  
*Mario Kusek and Gordan Jezic*  
51

Applying the Governance Framework Technique to Promote  
Maintainability in Open Multi-Agent Systems  
*Gustavo Carvalho, Carlos J.P. de Lucena, Rodrigo Paes,  
Ricardo Choren, and Jean-Pierre Briot*  
64

Designing Institutional Multi-Agent Systems  
*Carles Sierra, John Thangarajah, Lin Padgham, and  
Michael Winikoff*  
84

## Formal Reasoning About Designs

Modeling Mental States in the Analysis of Multiagent Systems  
*Alexei Lapouchkian and Yves Léspérance*  
Requirements ..................................................................... 104

Observed-MAS: An Ontology-Based Method for Analyzing Multi-Agent  
Systems Design Models .................................................. 122  
*Anarosa A.F. Brandão, Viviane Torres da Silva, and  
Carlos J.P. de Lucena*

Using Risk Analysis to Evaluate Design Alternatives  
*Yudistira Asnar, Volha Bryl, and Paolo Giorgini*  
140
Testing, Debugging and Evolvability

SUNIT: A Unit Testing Framework for Test Driven Development of Multi-Agent Systems ........................................... 156
   Ali Murat Tiryaki, Sibel Öztuna, Oguz Dikenelli, and
   Riza Cenk Erdur

Monitoring Group Behavior in Goal-Directed Agents Using Co-efficient Plan Observation ........................................ 174
   Jan Sudeikat and Wolfgang Renz

Evaluating a Model Driven Development Toolkit for Domain Experts to Modify Agent Based Systems ....................... 190
   Gaya Buddhinath Jayatilleke, Lin Padgham, and Michael Winikoff

Building the Core Architecture of a NASA Multiagent System Product Line ..................................................... 208
   Joaquin Peña, Michael G. Hinchey, Antonio Ruiz-Cortés, and
   Pablo Trinidad

Author Index ........................................................................... 225