

Table of Contents

- Chapter 1: Introduction1
 - 1.1 Two Worlds of Software Engineering.....2
 - 1.2 Requirements Specification for Information Systems6
 - 1.3 Synergy between the Pragmatic and the Formal World8
 - 1.4 Overview..... 11
- Chapter 2: Terminology..... 13
 - 2.1 Development Methods..... 13
 - 2.2 Formality..... 15
 - 2.3 Pragmatism 17
- Chapter 3: SSADM - A Pragmatic Requirements Engineering Method 19
 - 3.1 Motivation for the Choice of SSADM 19
 - 3.2 Modelling Techniques and Methodical Support in SSADM 21
 - 3.3 Hotel Agency: A Toy Project in SSADM 25
- Chapter 4: SPECTRUM - A Formal Specification Framework..... 27
 - 4.1 Characteristics of Spectrum..... 27
 - 4.2 Axiomatic Specifications in Spectrum 28
- Chapter 5: Alternative Ways to an Integration of SSADM and SPECTRUM 37
 - 5.1 Contributions of SSADM to an Integrated Approach..... 37
 - 5.2 Contributions of Spectrum to an Integrated Approach..... 44
 - 5.3 Options for the Integration 47
 - 5.4 Comparison with Other Approaches..... 58
- Chapter 6: A Semantic Reference Specification for SSADM..... 61
 - 6.1 Architecture of the Formal Basis for SSADM 61
 - 6.2 Core Reference Specification 66
 - 6.3 Core Extensions for Logical Data Modelling 69
 - 6.4 Core Extensions for Entity-Event Modelling 71
- Chapter 7: The SSADM Technique “Logical Data Modelling” 75
 - 7.1 Entity-Relationship Diagrams..... 75
 - 7.2 Formalization of ER Diagrams 80
 - 7.3 Entity Descriptions and Attributes..... 88
 - 7.4 Formalization of Entity Descriptions..... 90
 - 7.5 LDM Project Level Translation Schemes..... 95
- Chapter 8: The SSADM Technique “Entity-Event Modelling” 99
 - 8.1 EEM: Introduction and Terminology 99
 - 8.2 Event-Entity Matrix 104
 - 8.3 Effect Correspondence Diagrams 117
 - 8.4 Entity Life Histories 135

8.5	Operation Lists	146
8.6	EEM: The Whole Picture.....	153
8.7	EEM Project Level Translation Schemes.....	159
Chapter 9:	Logical Consistency of SSADM-F.....	161
9.1	Proof of Consistency by Executable Implementation.....	162
9.2	An Executable Specification for SSADM-F.....	164
9.3	Logical Prototyping of SSADM-F Specifications	180
Chapter 10:	Formal Extensions for SSADM-F	185
10.1	Combining Pragmatic and Formal Specifications	185
10.2	Extensions for Entity-Event Modelling	188
10.3	Interfaces between Spectrum and SSADM-F.....	194
10.4	Spectrum Extensions for SSADM-F.....	198
10.5	Perspectives for Formally Extended Pragmatic Specifications.....	205
Chapter 11:	The SSADM Technique “Data Flow Modelling”	207
11.1	Data Flow Diagrams in SSADM	207
11.2	Formalization of Data Flow Diagrams.....	210
11.3	Integration between DFM and LDM	215
11.4	Integration between DFM and EEM	218
Chapter 12:	Summary and Outlook.....	225
12.1	Summary.....	225
12.2	Evaluation.....	226
12.3	Outlook.....	229
Appendix A:	Glossary	233
Appendix B:	“Hotel Agency” - An SSADM-F Specification.....	241
B.1	DFD Documents.....	242
B.2	LDM Documents	242
B.3	EEM Documents	245
Appendix C:	SPECTRUM Translation of the “Hotel Agency” Specification	253
C.1	Translation of LDM Documents.....	253
C.2	Translation of EEM Documents	256
Appendix D:	Basic SPECTRUM Specifications.....	265
D.1	Lists.....	265
D.2	Finite Sets.....	267
D.3	Finite Maps	268
Bibliography		271
Subject Index.....		279