

Table of Contents

| | |
|--|-----|
| Preface | V |
| Acknowledgments | VII |
| 1. Introduction | 1 |
| 1.1 The plan of the book | 4 |
| 1.2 The book in context | 6 |
| 1.3 Preliminaries | 9 |
| 2. The original approach: Classical default logic | 11 |
| 2.1 Formal properties | 13 |
| 2.2 Restricted default theories | 18 |
| 2.3 A semantics for classical default logic | 20 |
| 3. An alternative approach: Constrained default logic | 23 |
| 3.1 Motivation | 23 |
| 3.2 Constrained default logic | 24 |
| 3.3 Formal properties | 26 |
| 3.4 The focused models semantics | 28 |
| 3.5 Variations of constrained default logic | 30 |
| 3.6 Conclusion | 32 |
| 4. Putting default logics into perspective | 33 |
| 4.1 Variants modifying the notion of consistency | 33 |
| 4.1.1 A guiding example | 33 |
| 4.1.2 Justified default logic | 34 |
| 4.1.3 Constrained default logic: Revisited | 37 |
| 4.1.4 Rational default logic | 40 |
| 4.2 Variants recording consistency assumptions | 41 |
| 4.2.1 Cumulative default logic | 42 |
| 4.2.2 Variants of cumulative default logic | 47 |
| 4.3 Other Variants | 50 |
| 4.4 Conclusion | 51 |

| | | |
|-----------|---|-----|
| 5. | A context-based framework for default logics | 53 |
| 5.1 | Motivation | 53 |
| 5.2 | Contextual default logic | 55 |
| 5.3 | Embedding existing default logics | 58 |
| 5.4 | Formal properties | 61 |
| 5.5 | Conclusion | 62 |
| 6. | Possible worlds semantics for default logics | 63 |
| 6.1 | Motivation | 63 |
| 6.2 | Possible worlds semantics for constrained default logic | 65 |
| 6.3 | Possible worlds semantics for classical default logic | 67 |
| 6.4 | Possible worlds semantics for justified default logic | 69 |
| 6.5 | Possible worlds semantics for contextual default logic | 72 |
| 6.6 | Conclusion | 74 |
| 7. | Adding specificity to default logics | 75 |
| 7.1 | Motivation | 75 |
| 7.2 | Determination of specificity information | 76 |
| 7.3 | Compiling specificity into default theories | 80 |
| 7.4 | Conclusion | 82 |
| 8. | Adding lemma handling to default logics | 85 |
| 8.1 | Motivation | 85 |
| 8.2 | Lemma handling in constrained default logic | 86 |
| 8.3 | Lemma handling in classical default logic | 90 |
| 8.4 | Conclusion | 90 |
| 9. | Query-answering in default logics | 93 |
| 9.1 | Motivation | 93 |
| 9.2 | Computational characterizations | 96 |
| 9.3 | A method for query-answering in default logics | 98 |
| 9.3.1 | The connection method | 99 |
| 9.3.2 | Complementarity | 100 |
| 9.3.3 | Admissibility | 102 |
| 9.3.4 | Compatibility | 103 |
| 9.3.5 | Characterizing default proofs | 105 |
| 9.4 | Implementing the approach | 106 |
| 9.4.1 | An algorithm | 107 |
| 9.4.2 | A preliminary case-study | 111 |
| 9.5 | An incremental approach | 112 |
| 9.5.1 | An alternative characterization of extensions | 113 |
| 9.5.2 | Incremental compatibility | 114 |
| 9.5.3 | An incremental algorithm | 116 |
| 9.6 | Discussion | 119 |
| 9.7 | Experiments | 121 |

| | | |
|-------------------|---|------------|
| 9.7.1 | A straightforward implementation | 121 |
| 9.7.2 | Implementations separating compatibility | 123 |
| 9.7.3 | Implementations integrating compatibility | 125 |
| 9.8 | Extensions | 127 |
| 9.8.1 | Integration of lemma handling | 128 |
| 9.8.2 | Model-based consistency-checking | 129 |
| 9.8.3 | Skeptical query-answering | 131 |
| 9.9 | Conclusion | 132 |
| 10. | A Prolog-technology compiler for query-answering | 135 |
| 10.1 | Motivation | 135 |
| 10.2 | Implementing query-answering | 136 |
| 10.3 | Extensions and implementation | 140 |
| 10.4 | Conclusion | 141 |
| 11. | Conclusions and perspectives | 143 |
| A. | Appendix | 147 |
| A.1 | Original definition of rational extensions | 147 |
| A.2 | Modal logic | 148 |
| References | | 149 |