

---

# Contents

<b>1</b>	<b>Introduction</b> .....	1
<b>2</b>	<b>Abstract Data Types</b> .....	5
	2.1 Algebraic Specification .....	5
	2.2 Term Rewriting .....	9
	2.3 Equality Functions .....	10
	2.4 Induction .....	11
<b>3</b>	<b>Process Algebra</b> .....	13
	3.1 Actions .....	13
	3.2 Alternative and Sequential Composition .....	14
	3.3 Parallel Processes .....	16
	3.4 Deadlock and Encapsulation .....	18
	3.5 Process Declarations .....	21
	3.6 Conditionals .....	22
	3.7 Summation over a Data Type .....	22
	3.8 An Example: The Bag .....	24
	3.9 Renaming .....	25
	3.10 Bisimilarity .....	25
<b>4</b>	<b>Hiding Internal Transitions</b> .....	29
	4.1 Hiding of Actions .....	29
	4.2 Summary .....	30
	4.3 An Example: Two One-Bit Buffers in Sequence .....	31
	4.4 Branching Bisimilarity .....	34
<b>5</b>	<b>Protocol Specifications</b> .....	41
	5.1 Alternating Bit Protocol .....	41
	5.2 Bounded Retransmission Protocol .....	45
	5.3 Sliding Window Protocol .....	52
	5.4 Tree Identify Protocol .....	57

5.5	Movable Patient Support for an MRI Scanner .....	63
<b>6</b>	<b>Linear Process Equations</b> .....	<b>69</b>
6.1	Linearisation .....	70
6.2	State Space Generation and Storage .....	74
6.3	CL-RSP .....	76
6.4	Invariants .....	77
<b>7</b>	<b>Verification Algorithms on State Spaces</b> .....	<b>81</b>
7.1	Minimisation Modulo Branching Bisimulation .....	81
7.2	Confluence .....	83
7.3	Model Checking .....	86
7.4	Abstraction .....	94
<b>8</b>	<b>Symbolic Methods</b> .....	<b>101</b>
8.1	Cones and Foci .....	101
8.2	Verification of the Tree Identify Protocol .....	104
8.3	Partial Order Reduction .....	107
8.4	Elimination of Parameters and Sum Variables .....	112
8.5	Symbolic Model Checking .....	116
<b>A</b>	<b>The <math>\mu</math>CRL Toolset in a Nutshell</b> .....	<b>125</b>
	<b>Solutions to Exercises</b> .....	<b>131</b>
	<b>References</b> .....	<b>143</b>
	<b>Index</b> .....	<b>149</b>



<http://www.springer.com/978-3-540-73937-1>

Modelling Distributed Systems

Fokkink, W.

2007, VIII, 154 p., Hardcover

ISBN: 978-3-540-73937-1