

Table of Contents

1 Informal Introduction to Coloured Petri Nets	1
1.1 Introduction to Place/Transition Nets	2
1.2 Introduction to Coloured Petri Nets	8
1.3 Example of CP-nets: Distributed Data Base	21
1.4 Net Inscriptions in CPN ML	26
1.5 Construction of CPN Models	32
1.6 Drawing of CPN Diagrams	41
1.7 Some Important Advantages of CP-nets	50
Bibliographical Remarks	52
Exercises	55
2 Formal Definition of Coloured Petri Nets	65
2.1 Multi-sets	66
2.2 Structure of Non-Hierarchical CP-nets	69
2.3 Behaviour of Non-Hierarchical CP-nets	73
2.4 Equivalent Place/Transition Nets	78
Bibliographical Remarks	85
Exercises	85
3 Hierarchical Coloured Petri Nets	89
3.1 Introduction to Hierarchical CP-nets	90
3.2 Example of Hierarchical CP-nets: Telephones	99
3.3 Structure of Hierarchical CP-nets	106
3.4 Behaviour of Hierarchical CP-nets	113
3.5 Equivalent Non-Hierarchical CP-nets	115
Bibliographical Remarks	119
Exercises	119
4 Dynamic and Static Properties of Coloured Petri Nets	123
4.1 Static Properties	124
4.2 Boundedness Properties	127
4.3 Home Properties	131
4.4 Liveness Properties	132
4.5 Fairness Properties	135
Bibliographical Remarks	138
Exercises	138

5 Formal Analysis of Coloured Petri Nets	141
5.1 Occurrence Graphs	142
5.2 Place and Transition Invariants	147
5.3 Reduction Rules	150
5.4 Performance Analysis	152
Bibliographical Remarks	152
Exercises	153
6 Computer Tools for Coloured Petri Nets	155
6.1 Editing of CP-nets	156
6.2 Simulation of CP-nets	176
6.3 Computer Tools for Formal Analysis	194
Bibliographical Remarks	202
Exercises	202
7 Industrial Applications of Coloured Petri Nets	205
7.1 Communication Protocol	206
7.2 Hardware Chip	209
7.3 Radar Surveillance	213
7.4 Electronic Funds Transfer	217
7.5 General Observations About CPN Applications	218
Bibliographical Remarks	219
References	221
Index	231