

Petri Net Modeling and Analysis of Concurrent Systems

Table of Contents

Chapter 1. Introduction (revised)

- 1.1 Overview
- 1.2 Application Areas
- 1.3 Transition Enabling and Firing Rules
- 1.4 Problems

Chapter 2. Introductory Modeling Examples

- 2.1 Finite State Machines
- 2.2 Parallel Activities
- 2.3 Dataflow Computation
- 2.4 Communication Protocols
- 2.5 Synchronization Control
- 2.6 Producers-Consumers System with Priority
- 2.7 Formal Languages
- 2.8 Multiprocessor Systems
- 2.9 Problems

Chapter 3. Behavioral Properties (revised)

- 3.1 Reachability
- 3.2 Boundedness
- 3.3 Liveness
- 3.4 Reversibility
- 3.5 Coverability
- 3.6 Persistence
- 3.7 Synchronic Distance
- 3.8 Fairness
- 3.9 Problems

Chapter 4. Analysis Methods

- 4.1 The Coverability Tree
- 4.2 Incidence Matrix and State Equations
 - 4.2.1 Incidence Matrix
 - 4.2.2 State Equation
 - 4.2.3 Necessary Condition for Reachability in Unrestricted Nets
- 4.3 Simple Reduction Rules for Analysis
- 4.4 Problems

Appendix to Chapter 4: Proof of Theorem 4.1 and Derivation of the B_f matrix

Chapter 5 Liveness and Safeness

- 5.1 Subclasses of Petri Nets
- 5.2 Existence of Live-Safe Markings
- 5.3 Liveness and Safeness of State Machines and Marked Graphs
- 5.4 Siphons and Traps
- 5.5 Liveness and Safeness of Free-Choice and Asymmetric Choice Nets
- 5.6 Problems
- 5.7 The Rank Theorem (new)
- 5.8 Complete Sets of Transformation Methods for LBFC Nets (new)