

392013 Exercises Algorithmic Cheminformatics

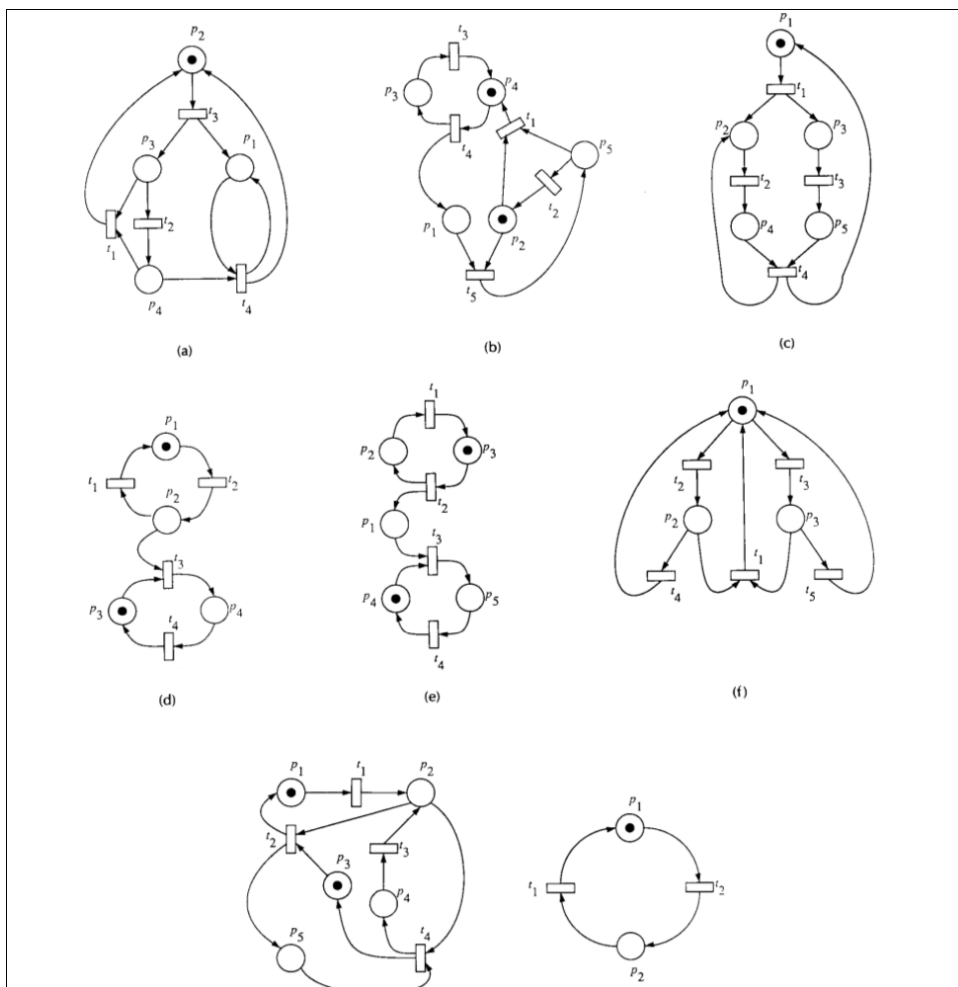
Exercise Sheet 06: Petri Nets

June 7, 2026

1 Liveness, Boundedness, Quasi-Liveness, and Reversibility

For the following eight Petri nets, determine for each net whether it is

- bounded,
- live,
- quasi-live, and
- reversible.



2 Petri Nets – Invariants

Given the following Petri net:

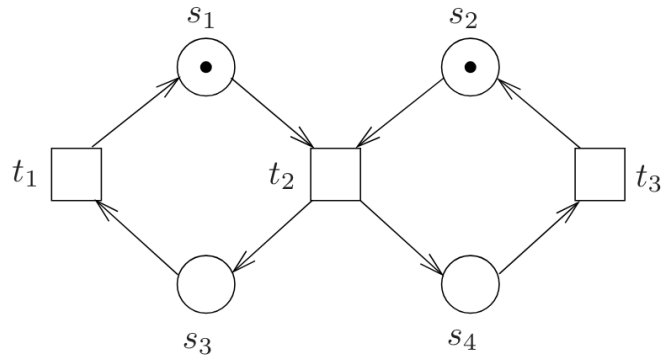


Figure 1

- Determine the incidence matrix.
- Determine all transition invariants of the Petri net, first directly and then with the Farkas / Fourier–Motzkin algorithm.
- Determine all place invariants of the Petri net, first directly and then with the Farkas / Fourier–Motzkin algorithm.

3 Petri Nets – Invariants

Given the following Petri net:

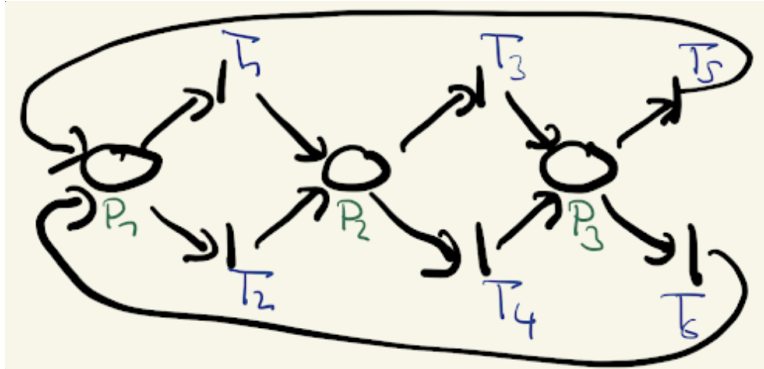


Figure 2

- Determine the incidence matrix.
- Determine all transition invariants of the Petri net, first directly and then with the Farkas / Fourier–Motzkin algorithm.
- Determine all place invariants of the Petri net, first directly and then with the Farkas / Fourier–Motzkin algorithm.

4 Reachability / Coverability Graph

Given the following Petri net:

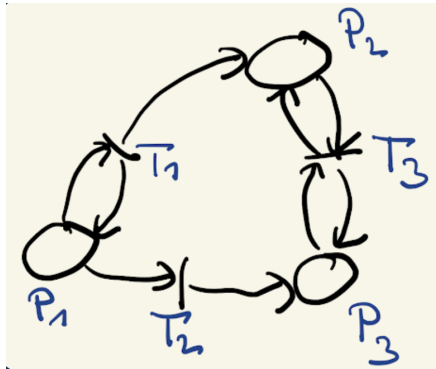


Figure 3

- Is the Petri net k -safe for a certain value of k ?
- Determine the reachability or coverability graph.