Tutorial 3

1. How to simulate an n-dimensional VASS using an $(n + 3)$-dimensional VAS?

2. Does liveness imply that from any reachable configuration in a (general) Petri net we can go back to the initial one?

3. Prove that a trace language is regular if and only if it has a finite number of left quotients.

4. Let $[w]$, $[v]$, $[u]$ be traces such that $[w]$ and $[v]$ are prefixes of $[u]$. Prove that

   (a) there exist a maximal trace (prefix-wise) that is a prefix of $[w]$ and $[v]$,

   (b) there exist a minimal trace such that $[w]$ and $[v]$ are its prefixes.

Homework (not mandatory)

1. Given dependence alphabet (Σ, D) and language L the task is to check whether L is trace-closed. Prove that this problem is decidable when L is regular and undecidable for L context-free.