

Theoretical Aspects of Logistics

Interesting Properties of Processes

Examples (emphasizing certain aspects)

1. $(V^*, \rightarrow, \{a\}, V^*)$ with
 - (a) $u \rightarrow uu$ for all $u \in V^*$
 - (b) $a \rightarrow b, a \rightarrow c, b \neq c$
 - (c) $a \rightarrow b, b \rightarrow a$
 - (d) $au \rightarrow abu$ for all $u \in V^*$
2. $(V^*, \rightarrow, V^*, (V - \{a\})^*)$ with $xay \rightarrow xy$ for all $x, y \in V^*$
3. $(V^*, \rightarrow, V^*, \{a_1 \dots a_n \mid a_i \leq a_{i+1} \text{ für } i = 1, \dots, n-1\})$ with
 - (a) $uxvwy \rightarrow uyvxw$ for all $x, y \in V, u, v, w \in V^*$
 - (b) $uxvwy \rightarrow uyvxw$ if $x > y$ for all $x, y \in V, u, v, w \in V^*$
 - (c) $uxyv \rightarrow uyxv$ for all $x, y \in V, u, v \in V^*$
 - (c) $uxyv \rightarrow uyxv$ if $x > y$ for all $x, y \in V, u, v \in V^*$
4. $(V^* \times \mathbb{N}, \rightarrow, V^* \times \{0\}, \{\lambda\}, \times \mathbb{N})$ with $(xu, n) \rightarrow (u, n+1)$ for all $x \in V, u \in V^*, n \in \mathbb{N}$
5. $(V^* \times 2^V, \rightarrow, V^* \times \{\emptyset\}, \{\lambda\} \times 2^V)$ with $(xu, X) \rightarrow (u, \{x\} \cup X)$ for all $x \in V, u \in V^*, X \subseteq V$
6. **Variant of TSP**

configs: $(V, dist : V \times V \rightarrow \mathbb{N}, v_1 \dots v_n)$ where the first two components are invariant and the last sequence is a permutation of V

steps: $uvv'u' \rightarrow uv'vu'$ if $dist(uvv'u') > dist(uv'vu')$

initial: all

terminal: reduced
7. $(\{n, e, s, w\}^*, \rightarrow, \{n, e, s, w\}^*, reduced)$
 - (a) $uxyv \rightarrow uyxv$ for all $x \in \{e, w\}, y \in \{n, s\}$ and $u, v \in \{n, e, s, w\}^*$,
 - (b) $unsv \rightarrow uv, usnv \rightarrow uv, uewv \rightarrow uv, uvev \rightarrow uv$ for all $u, v \in \{n, e, s, w\}^*$
8. $(\mathbb{N}^*, \rightarrow, \mathbb{N}^*, \mathbb{N})$ with $sxyt \rightarrow s(x+y)t$ for all $x, y \in \mathbb{N}, s, t \in \mathbb{N}^*$