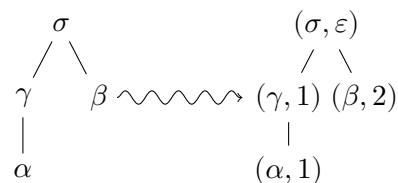


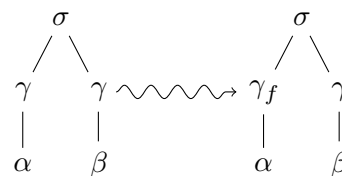
Formale Übersetzungsmodelle

Task 3 (relabeling and checking)

- (a) Give a bu-tt M_1 that, for every tree $\xi \in T_\Sigma$, enhances for every position $w \in \text{pos}(\xi)$ the label at w with the last digit of w .
- (b) Let $\gamma \in \Sigma$. Give a bu-tt M_2 that, for every tree $\xi \in T_\Sigma$, replaces the first occurrence (according to depth-first order) of γ in ξ by γ_f without changing the rest of ξ .



(a) transformation $\tau(M_1)$



(b) transformation $\tau(M_2)$

Task 4 (proof by structural induction)

Let A be a set, Σ be a ranked alphabet, $\xi, \zeta \in T_\Sigma(A)$, and $w \in \text{pos}(\xi)$. Prove or refute the following statements:

- (a) $\xi(w) = \xi|_w(\varepsilon)$.
- (b) $(\xi[\zeta]_w)|_w = \zeta$.
- (c) $|\text{pos}(\xi)| = |\text{sub}(\xi)|$.
- (d) $\text{height}(\xi) = 1 + \max\{|\rho| \mid \rho \in \text{pos}(\xi)\}$.

Task 5 (generalized sequential machines and bu-tt)

Let $G = (Q, \Sigma, \Delta, q_0, F, R)$ be a gsm. Give bu-tts that simulate the run of G

- (a) on the nodes of monadic trees from front to root.
- (b) on the front of trees from left to right.

Note: The tutorial's time might not suffice to present all solutions. Please prepare to ask for the solutions you are most interested in.