

Formale Übersetzungsmodelle

Task 17 (Decomposition of TOP)

Let $\Sigma = \{\gamma^{(1)}, \alpha^{(0)}\}$ and $\Delta = \{\sigma^{(2)}, O^{(1)}, E^{(1)}, \alpha^{(0)}\}$ be ranked alphabets and $\xi = \gamma(\gamma(\alpha)) \in T_{\Sigma}$.

- (a) Give a td-tt T such that $\tau(T)$ transforms every tree in T_{Σ} into a tree in T_{Δ} such that each γ is replaced by σ where the subtree of γ is copied and, starting with O at the top, alternately O and E are inserted before each symbol.

Give a derivation of T for ξ .

- (b) Give a top-down tree homomorphism H and a linear top-down tree transducer T' such that $\tau(T) = \tau(H) \circ \tau(T')$.

Give derivations of H and T' for ξ .

Task 18 (h -TOP = HOM **and r -TOP = REL)**

- (a) Prove by construction that h -TOP = HOM.

- (b) Prove by construction that r -TOP = REL.

Hint: Define relatedness for a top-down tree homomorphism (relabeling) and a bottom-up tree homomorphism (relabeling). Show that the respective transducers induce the same tree transformation if they are related (Lemma). Use the Lemma to obtain the equivalence of the respective classes.