

# Maschinelles Übersetzen natürlicher Sprachen

## 10. Übungsblatt

2015-01-29

### Aufgabe 1

Consider the following probabilistic regular tree grammar with start symbol  $S$ .

$$\rho_1: S \rightarrow \sigma(A, S) \quad \# 1/2$$

$$\rho_2: S \rightarrow \beta \quad \# 1/2$$

$$\rho_3: A \rightarrow \gamma(A) \quad \# 1/2$$

$$\rho_4: A \rightarrow \gamma(S) \quad \# 1/4$$

$$\rho_5: A \rightarrow \alpha \quad \# 1/4$$

Calculate the inside and outside weights of  $A$  and  $S$ .

### Aufgabe 2

Consider the following probabilistic regular tree grammar.

$$\rho_1: S \rightarrow \gamma(S) \quad \# 1 - q$$

$$\rho_2: S \rightarrow \alpha \quad \# q$$

Calculate the inside and outside weight of  $S$ . Show that the expected count of a rule  $\rho$  in a derivation of this grammar is  $out(A_0) \cdot p(\rho) \cdot \prod_{i=1}^k in(A_i)$  where  $A_0 \rightarrow \sigma(A_1, \dots, A_k) = \rho$ .