



Fuzzy Description Logics

Summer Semester 2017

Exercise Sheet 6

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Exercise 6.1 Prove Theorem 5.1 presented in the lecture: For any \mathcal{EL} TBox \mathcal{T} , the normalization rules produce in polynomial time a TBox \mathcal{T}' such that, for every $A, B \in \{P \mid P \text{ is a concept name in } \mathcal{T}\} \cup \{\top\}$ and for every $q \in [0, 1]$, it holds that

$$\langle A \sqsubseteq_{\mathcal{T}} B, q \rangle \quad \text{iff} \quad \langle A \sqsubseteq_{\mathcal{T}'} B, q \rangle$$

Exercise 6.2 Prove the missing cases of Lemma 5.2 from the lecture: The completion algorithm preserves the following invariants:

- (a) $(B, q) \in S(A)$ implies $\langle A \sqsubseteq_{\mathcal{T}} B, q \rangle$
- (b) $(r, q) \in R(A, B)$ implies $\langle A \sqsubseteq_{\mathcal{T}} \exists r.B, q \rangle$

Exercise 6.3 Prove that best subsumption degrees in Gödel \mathcal{EL} can be computed in polynomial time.