Exercises: Inconsistency Handling

Exercise 1

For \( i \in \{1, \ldots, 4\} \) and \( S \in \{\text{AR, IAR, brave, } k\text{-supp, } k\text{-def, ICR}\} \), does \( \langle T, A_i \rangle \models_S q(\text{ann}) \) ? In the \( k\text{-supp} \) and \( k\text{-def} \) cases, precise for which \( k \) it holds.

\[ T = \{ \text{AProf} \sqsubseteq \text{Prof}, \text{FProf} \sqsubseteq \text{Prof}, \text{Prof} \sqsubseteq \text{PhD, Postdoc} \sqsubseteq \text{PhD}, \text{PhD} \sqsubseteq \text{Person}, \exists \text{Teach} \sqsubseteq \text{Person}, \exists \text{Teach}^- \sqsubseteq \text{Course,} \text{Prof} \sqsubseteq \exists \text{WorkFor, Student} \sqsubseteq \exists \text{MemberOf, WorkFor} \sqsubseteq \exists \text{MemberOf,} \text{AProf} \sqsubseteq \neg \text{FProf}, \text{Prof} \sqsubseteq \neg \text{Postdoc, Student} \sqsubseteq \neg \text{Prof,} \text{Person} \sqsubseteq \neg \text{Course,} \exists \text{MemberOf}^- \sqsubseteq \neg \text{Postdoc}\} \]

\[ A_1 = \{ \text{AProf}(\text{ann}), \text{FProf}(\text{ann}), \text{Prof}(\text{ann}), \text{Teach}(\text{ann}, c), \text{Teach}(\text{ann}, \text{ann}) \} \]

\[ A_2 = \{ \text{AProf}(\text{ann}), \text{FProf}(\text{ann}), \text{Postdoc}(\text{ann}), \text{MemberOf}(\text{ann}, dpt), \text{Teach}(\text{ann}, c) \} \]

\[ A_3 = \{ \text{AProf}(\text{ann}), \text{Teach}(\text{ann}, c_1), \text{Teach}(\text{ann}, c_2), \text{Teach}(c_1, c_2), \text{Teach}(c_2, c_1) \} \]

\[ A_4 = \{ \text{AProf}(\text{ann}), \text{Teach}(\text{ann}, c_1), \text{Teach}(\text{ann}, c_2), \text{AProf}(c_1), \text{AProf}(c_2) \} \]

\[ q(x) = \exists y z \text{PhD}(x) \land \text{MemberOf}(x, y) \land \text{Teach}(x, z) \]

Exercice 2

Consider the TBox \( T \) of Exercise 1 and the query

\[ q(x) = \exists y \text{Prof}(x) \land \text{Teach}(x, y). \]

1. Propose a FO rewriting \( q'(x) \) of \( q(x) \) such that for every ABox \( A \), \( \langle T, A \rangle \models_{\text{IAR}} q(x) \) iff \( A \models q'(x) \)

2. Propose a FO rewriting \( q'(x) \) of \( q(x) \) such that for every ABox \( A \), \( \langle T, A \rangle \models_{\text{brave}} q(x) \) iff \( A \models q'(x) \)