

Handout: Inconsistency-Tolerant Query Answering

Repairs

An ABox \mathcal{A} is \mathcal{T} -consistent if the KB $(\mathcal{T}, \mathcal{A})$ is satisfiable, i.e. it has at least one model, and otherwise, it is said to be \mathcal{T} -inconsistent.

A *repair* of an ABox \mathcal{A} w.r.t. a TBox \mathcal{T} is an inclusion-maximal subset of \mathcal{A} that is \mathcal{T} -consistent. We use $Rep(\mathcal{A}, \mathcal{T})$ to denote the set of repairs of \mathcal{A} w.r.t. \mathcal{T} , which we abbreviate to $Rep(\mathcal{K})$ when $\mathcal{K} = (\mathcal{T}, \mathcal{A})$.

Semantics

AR semantics: A tuple \vec{a} is an answer to a query $q(\vec{x})$ over $\mathcal{K} = (\mathcal{T}, \mathcal{A})$ under the *AR semantics*, written $\mathcal{K} \models_{AR} q(\vec{a})$, iff $(\mathcal{T}, \mathcal{B}) \models q(\vec{a})$ for every repair $\mathcal{B} \in Rep(\mathcal{K})$.

IAR semantics: A tuple \vec{a} is an answer to a query $q(\vec{x})$ over $\mathcal{K} = (\mathcal{T}, \mathcal{A})$ under the *IAR semantics*, written $\mathcal{K} \models_{IAR} q(\vec{a})$, iff $(\mathcal{T}, \mathcal{D}) \models q(\vec{a})$ where $\mathcal{D} = \bigcap_{\mathcal{B} \in Rep(\mathcal{K})} \mathcal{B}$.

Brave semantics: A tuple \vec{a} is an answer to a query $q(\vec{x})$ over $\mathcal{K} = (\mathcal{T}, \mathcal{A})$ under the *brave semantics*, written $\mathcal{K} \models_{brave} q(\vec{a})$, just in the case that $(\mathcal{T}, \mathcal{B}) \models q(\vec{a})$ for some repair $\mathcal{B} \in Rep(\mathcal{K})$.