

9. Tableaux for \mathcal{ALC} TBoxes

Exercise 9.1 Consider the following \mathcal{ALC} TBox \mathcal{T} :

$$\begin{aligned} A &\equiv \forall R. \neg(\neg B \sqcap C) \\ B &\equiv \exists R. C \end{aligned}$$

1. Analyze whether \mathcal{T} is cyclic.
2. Determine, using tableaux, whether the concepts
 - (a) $\exists R.(A \sqcap B)$ and
 - (b) $A \sqcap \exists R.A \sqcap \neg(\exists R.\neg C \sqcup \exists R.\exists R.C)$are satisfiable w.r.t. \mathcal{T} .
3. Suppose that the assertion $C \equiv A \sqcup D$ is added to \mathcal{T} . Discuss whether the same tableaux technique used before can be applied, motivating your answer. If not, explain how the tableaux technique has to be extended.