A Tableau algorithm for $\mathcal{ALCSCC}$

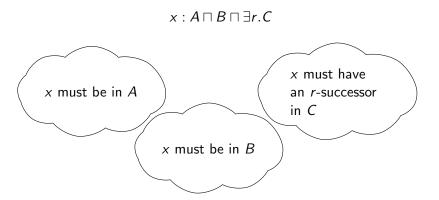Ryny Khy

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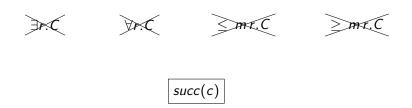# Tableau Algorithm

Main Idea:

$$x : A \sqcap B \sqcap \exists r.C$$

x must be in A

x must have
an r-successor
in C

x must be in B

$\mathcal{ALCSCC}$: successors

~~$\exists r.C$~~   ~~$\forall r.C$~~   ~~$\leq m\, r.C$~~   ~~$\geq m\, r.C$~~

$$\boxed{succ(c)}$$

c: **set constraint** or a **cardinality constraint**

$\mathcal{ALCSCC}$: constraints

set constraint:

- $r \subseteq s$
- $C \cap r \subseteq D$
- $succ(C \cap r) \subseteq succ(D)$

cardinality constraint

- $3 \, dvd \, |r|$
- $|C \cap r| \leq |D|$
- $|succ(C \cap r)| \leq |succ(D)|$

Problem with successors constraints

$$x : succ(|s| > 1) \sqcap succ(|r| = |s|) \sqcap succ(|r| > |s|)$$

s-successors

r-successors

$\left(\,0\,\right)$

$\left(\,0\,\right)$

Problem with successors constraints

$$x : \underline{succ(|s| > 1)} \sqcap succ(|r| = |s|) \sqcap succ(|r| > |s|)$$

s-successors   r-successors

$\left(1 \right)$ $\left(0 \right)$

Problem with successors constraints

$$x : succ(|s| > 1) \sqcap \underline{succ(|r| = |s|)} \sqcap succ(|r| > |s|)$$

s-successors   r-successors

$\left(1 \right)$ $\left(1 \right)$

Problem with successors constraints

$$x : succ(|s| > 1) \sqcap succ(|r| = |s|) \sqcap \underline{succ(|r| > |s|)}$$

s-successors $\qquad\qquad$ r-successors

$\left(1\right)$ $\qquad\qquad\qquad$ $\left(2\right)$