

Mai 14-10:07

prove F

→ start tableau with $\neg F$

develop/call tableau

close Tableau

⇒ $\neg F$ is impossible

⇒ F ~~holds~~ "is valid"

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$\forall p: \text{Emp}(p) \rightarrow \exists d: (\text{Dept}(d) \wedge \text{wfk}(p, d))$
 $\text{Emp}(\text{Alice})$
 we know that every person works for at least one, and at most 3 depts.

$\text{Emp}(P) \rightarrow \exists d (\text{Dept}(d) \wedge \text{wfk}(P, d))$
 $\neg \text{Emp}(P)$

$\exists d (\text{Dept}(d) \wedge \text{wfk}(P, d))$
 $\text{Dept}(\neq(P)) \wedge \text{wfk}(P, \neq(P))$
 $\text{Dept}(\neq(\text{Alice})) \wedge \text{wfk}(\text{Alice}, \neq(\text{Alice}))$

$\square \{P \rightarrow \text{Alice}\}$

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$\forall x: p(x) \rightarrow q(x)$
 $p(a)$
 $q(b)$
 $\neg q(x)$

$\square \{x \rightarrow b\}$ first answer

$p(x_2) \rightarrow q(x_2)$
 $\neg p(x_2)$ $q(x_2)$
 $\square \{x_2 \rightarrow a\}$ $q(a)$
 $\square \{x \rightarrow a\} \rightarrow \text{next answer}$

try other
 clauses
 possibilities

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§ 6.4 Erkennung:

(2) $\forall x: \text{person}(x) \rightarrow \exists y (\text{person}(y) \wedge \text{father}(x, y))$

(3) $\forall x, y, z: \text{father}(x, y) \wedge \text{father}(y, z) \rightarrow \text{grandfather}(x, z)$

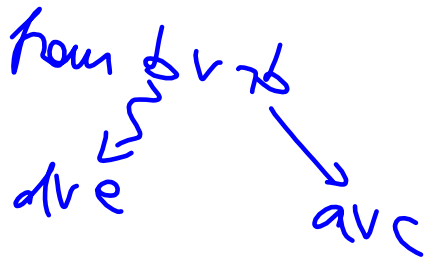
$\begin{aligned} & \text{P}(\text{john}) \\ & \text{P}(\text{jack}) \\ & \neg(\text{john}, \text{jack}) \\ & \neg \text{grand}(\text{john}, X) \\ & \text{P}(X_1) \rightarrow \exists y: \text{P}(y) \wedge \neg(\text{X}_1, y) \\ & \neg \text{P}(X_1) \\ & \text{P}(\text{father}(X_1) \wedge \neg(\text{X}_1, \text{father}(X_1))) \\ & \text{P}(\text{father}(X_1) \wedge \neg(\text{X}_1, \text{father}(X_1))) \\ & \text{P}(\text{father}(\text{father}(\text{john})) \wedge \neg(\text{john}, \text{father}(\text{father}(\text{john}))) \\ & \text{P}(\text{father}(\text{father}(\text{john}))) \\ & \neg(\text{john}, \text{father}(\text{father}(\text{john}))) \\ & \text{P}(X_2) \rightarrow \exists y (\text{P}(y) \wedge \neg(\text{X}_2, y)) \\ & \neg \text{P}(X_2) \\ & \exists y: \text{P}(y) \wedge \neg(\text{X}_2, y) \\ & \text{P}(\text{father}(X_2) \wedge \neg(\text{X}_2, \text{father}(X_2))) \\ & \text{P}(\text{father}(\text{father}(\text{father}(\text{john}))) \wedge \neg(\text{father}(\text{father}(\text{father}(\text{john}))), \text{father}(\text{father}(\text{father}(\text{john})))) \\ & \text{father}(X_3, Y_3) \wedge \text{father}(Y_3, Z_3) \rightarrow \text{grand}(X_3, Z_3) \\ & \neg(\text{father}(X_3, Y_3) \wedge \neg(\text{Y}_3, Z_3)) \\ & \neg(\text{X}_3, Y_3) \quad \neg(\text{Y}_3, Z_3) \\ & \text{X}_3 \rightarrow \text{john} \\ & \text{Y}_3 \rightarrow \text{father}(\text{john}) \\ & \text{Z}_3 \rightarrow \text{father}(\text{father}(\text{john})) \\ & \text{grand}(\text{X}_3, Z_3) \\ & \text{grand}(\text{X}_3, Z_3) \\ & \text{grand}(\text{father}(\text{father}(\text{john})), \text{father}(\text{father}(\text{father}(\text{john})))) \\ & \text{grand}(\text{father}(\text{father}(\text{john})), \text{father}(\text{father}(\text{father}(\text{john})))) \\ & \text{answer: } X \rightarrow \text{father}(\text{father}(\text{father}(\text{john}))) \end{aligned}$

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Resolution calc

a v b v c d v ¬ b v e

Consequents: a v c v d v e



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