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(1)

$\forall x(I(x) \to G(x)),\ \exists x(I(x) \wedge P(x)),\ \forall x((G(x) \wedge P(x)) \to \neg TM(x)),$

$\forall x(\neg TM(x) \to EM(x)) \models \exists x(I(x) \wedge EM(x))$

Es insatisfacibilitat

SSI

$\forall x_1(\neg I(x_1) \vee G(x_1)) \wedge (I(a_1) \wedge P(a_1)$

$\wedge \forall x_2(\neg G(x_2) \vee \neg P(x_2) \vee \neg TM(x_2) \wedge \forall x_3(\neg \neg TM(x_3) \vee EM(x_3))$

$\wedge \quad \forall x_4(\neg I(x_4) \vee \neg EM(x_4))$ és insatisfacible

$\{\underset{c_1}{\neg I(x_1), G(x_1)}\}, \{\underset{c_2}{I(a_1)}\}, \{\underset{c_3}{P(a_1)}\}, \{\underset{c_4}{\neg G(x_2), \neg P(x_2), \neg TM(x_2)}\},$

$\{\underset{c_5}{\neg \neg TM(x_3), EM(x_3)}\}, \{\underset{c_6}{\neg I(x_4), \neg EM(x_4)}\}$

c_1 c_2 $\vee_{a_1/x_1}$ $\{\underset{c_7}{G(a_1)}\}$

c_7 c_4 $\vee_{a_1/x_2}$ $\{\underset{c_8}{\neg P(a_1), \neg TM(a_1)}\}$

c_8 c_3 $\vee$ $\{\underset{c_9}{\neg TM(a_1)}\}$

c_9 c_5 $\vee_{a_1/x_3}$ $\{\underset{c_{10}}{EM(a_1)}\}$

c_{10} c_6 $\vee_{a_1/x_4}$ $\{\underset{c_{11}}{\neg I(a_1)}\}$

c_{11} c_2 $\vee$ $\square$

És insatisfacible, per tant l'enunciat és correcte

$H = \{a\}$

$IB(G')$

$\{\neg I(a), G(a)\}$

$\{I(a)\}, \{P(a)\}$

$\{\neg G(a), \neg P(a), TM(a)\}$

$\{\neg TM(a), EM(a)\}$

$\{\neg I(a), \neg EM(a)\}$

$I(a) - 1$

$G(a) - 2$

$P(a) - 3$

$TM(a) - 4$

$EM(a) - 5$

P	cmf	S	G
-1	2	$\emptyset$	
1	$\emptyset$		
3	$\emptyset$		
-2	-3	4	$\emptyset$
-4	5	$\emptyset$	
-1	-5	$\emptyset$	

(2) $\forall x(P(x) \to D(x)),\ \exists x(P(x) \wedge F(x)),\ \forall x((P(x) \wedge F(x)) \to \neg IC(x))$

$\forall x(CH(x) \to IC(x)) \models \exists x(P(x) \wedge \neg CH(x))$

És millor així

$\forall x_1(P(x_1) \to D(x_1)),\ (P(a_1) \wedge F(a_1)),\ \forall x_2((P(x_2) \wedge F(x_2)) \to \neg IC(x_2))$

$\forall x_3(CH(x_3) \to IC(x_3)) \wedge \forall x_4(\neg P(x_4) \vee CH(x_4))$

és insatisfactible

$\{\neg P(x_1), D(x_1)\}_{C_1},\ \{P(a_1)\}_{C_2},\ \{F(a_1)\}_{C_3},\ \{\neg P(x_2), \neg F(x_2), \neg IC(x_2)\}_{C_4}$

$\{\neg CH(x_3), IC(x_3)\}_{C_5},\ \{\neg P(x_4), CH(x_4)\}_{C_6}$

C_1 C_2 a_1/x_1 $\{D(a_1)\}_{C_7}$

C_3 C_4 a_1/x_2 $\{\neg P(a_1), \neg IC(a_1)\}_{C_8}$

C_5 C_6 x_3/x_4 $\{IC(x_3), \neg P(x_3)\}_{C_9}$

C_8 C_9 a_1/x_3 $\{\neg P(a_1)\}_{C_{10}}$

C_{10} C_7 $\square$

És insatisfactible, per tant l'enunciat és correcte

$H = \{a\}$ $\quad IB(G)$

$\{\neg P(a), D(a)\}, \{P(a)\}, \{F(a)\}$

$\{\neg P(a), \neg F(a), \neg IC(a)\}$

$\{\neg CH(a), IC(a)\}$

$\{\neg P(a), CH(a)\}$

$P(a) - 1$
$D(a) - 2$
$F(a) - 3$
$IC(a) - 4$
$CH(a) - 5$

P	CM	5	6
-1	2	∅	
1	∅		
3	∅		
-1	-3	-4	∅
4	-5	∅	
-1	5	∅	

③ $\forall x,y(A(x) \rightarrow (T(x,y) \wedge V(y) \wedge \neg P(y))$,

$\exists x,y(V(x) \wedge I(x) \wedge T(y,x) \wedge I(y))$,

$\forall x(I(x) \rightarrow \neg P(x)) \models \exists x(A(x) \wedge I(x))$

Es insatisfacible si

$\forall x_1,y_1(A(x_1) \rightarrow (T(x_1,y_1) \wedge V(y_1) \wedge \neg P(y_1)) \wedge$

$(V(a_1) \wedge I(a_1) \wedge T(a_2,a_1) \wedge I(a_2)) \wedge \forall x_2(I(x_2) \rightarrow \neg P(x_2))$

$\wedge \quad \forall x_3(\neg A(x_3) \vee \neg I(x_3))$ es insatisfacible

$\forall x_1,y_1(A(x_1) \rightarrow (T(x_1,y_1) \wedge V(y_1) \wedge \neg P(y_1)) \equiv$

$\forall x_1,y_1((\neg A(x_1) \vee T(x_1,y_1)) \wedge (\neg A(x_1) \vee V(y_1)) \wedge (\neg A(x_1) \vee \neg P(y_1))$

$\{\underset{c_1}{\neg A(x_1)}, T(x_1,y_1)\}, \{\underset{c_2}{\neg A(x_1)}, V(y_1)\}, \{\underset{c_3}{\neg A(x_1)}, \neg P(y_1)\}, \{\underset{c_4}{V(a_1)}\}, \{\underset{c_5}{I(a_1)}\},$

$\{\underset{c_6}{T(a_2,a_1)}\}, \{\underset{c_7}{I(a_2)}\}, \{\underset{c_8}{\neg I(x_2)}, \neg P(x_2)\}, \{\underset{c_9}{\neg A(x_3)}, \neg I(x_3)\}$

c_5 c_8 $\swarrow a_1/x_2$ $\{\neg P(a_1)\}$

c_5 c_9 $\swarrow a_1/x_3$ $\{\neg A(a_1)\}$

c_7 c_8 $\swarrow a_2/x_2$ $\{\neg P(a_2)\}$

c_7 c_9 $\swarrow a_2/x_3$ $\{\neg A(a_2)\}$

$H = \{a\}$

$IB(C)$

$\{\neg A(a), T(a,a)\}, \{\neg A(a), V(a)\}$

$\{\neg A(a), \neg P(a)\}, \{V(a)\}, \{I(a)\}$

$\{T(a,a)\}, \{\neg I(a), \neg P(a)\}$

$\{\neg A(a), \neg I(a)\}$

$V(a) - 7$

$A(a) - 2$

$I(a) - 3$

$P(a) - 4$

$T(a,a) - 5$

P	CM	S	8
-2	5	∅	
-2	7	∅	
-2	-4	∅	
7	∅		
3	∅		
5	∅		
-3	-4	∅	
-2	-3	∅	