(61) Juan Valentín Guerrero Cano. | Relación Unificación y Resolución

(1) $\{Q(x, f(y)), Q(f(z), f(a))\}$

$$\begin{cases} x = f(z) \\ f(y)=f(a) \Rightarrow a=y \end{cases} \Rightarrow \text{Unificable.}$$

(2) $\{P(x, g(x,a), f(y)), P(x, g(g(f(y),b),y), f(a))\}$

$$\begin{cases} x = x \\ g(x,a) = g(g(f(y),b),y) \Rightarrow x = g(f(y),b) \quad a=y \Rightarrow x=g(f(a),b) \\ f(y) = f(a) \end{cases}$$

Luego unificable

(3) $\{Q(x, g(x,y)), Q(y,z), Q(z, g(x,a))\}$

$$\begin{cases} x = y = z \\ g(x,y) = z = g(x,a) \Rightarrow \quad y=a \quad x=x \Rightarrow g(x,a)=z \end{cases}$$

Luego unificable.

(4) $\{R(f(x), g(f(z),y), g(a, f(f(x)))), R(y, g(f(a), f(f(b))), g(z, f(y)))\}$

$$\begin{cases} f(x) = y \\ g(f(z),y) = g(f(a), f(f(b))) \Rightarrow f(z)=f(a) \quad y = f(f(b)) \\ g(a, f(f(x))) = g(z, f(y)) \Rightarrow a = z \quad f(f(x)) = f(y) \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} f(x) = f(f(b)) \Rightarrow y = f(x) \\ y = f(x) \Rightarrow f(b) = x \\ z = a \end{cases}$$

Unificable.

6.2

1. $\{Q(a), \neg R(a,y), \neg Q(x) \vee R(x,f(x))\}$

$\neg Q(x) \vee R(x,f(x))$ $\qquad$ $Q(a)$

$x|a$

$R(a,f(a))$

$\neg R(a,y)$

$y|f(a)$

$\square$ $\Rightarrow$ Insatisfacible.

2. $\{\neg Q(a,y), \neg S(x) \vee Q(x,f(x)), S(a)\}$

$\neg S(x) \vee Q(x,f(x))$ $\qquad$ $S(a)$

$x|a$

$Q(a,f(a))$

$\neg Q(a,y)$

$y|f(a)$

$\square$ $\Rightarrow$ Insatisfacible.

3. $\{P(a), \neg S(a,x), \neg P(y) \vee S(y,f(y))\}$

$\neg P(y) \vee S(y,f(y))$ $\qquad$ $P(a)$

$y|a$

$S(a,f(a))$

$\neg S(a,x)$

$x|f(a)$

$\square$ $\Rightarrow$ Insatisfacible.

4. $\{P(x),\ \neg P(x) \vee Q(x,a),\ \neg Q(y,a)\}$

$\neg P(x) \vee Q(x,a)$ $\qquad$ $P(x)$

$Q(x,a)$ $\qquad$ $\neg Q(y,a)$

$x = y$

$\square \Rightarrow$ Insatisfacible.

5. $\{P(x, a, g(x,b)),\ \neg P(f(y), z, g(f(a),b))\}$

$P(x,a,g(x,b))$ $\qquad$ $\neg P(f(y), z, g(f(a),b))$

$x | f(y)$
$z | a$
$y | a$

$\square \Rightarrow$ Insatisfacible.

6.3

$\exists x\ (M(x) \wedge \neg D(x))$

1. $\forall y (\neg C(y) \to \exists x\ A(x,y))$
2. $\forall x\ [\exists y\ (\neg C(y) \wedge A(x,y)) \to M(x)]$
3. $\forall x\ (D(x) \to M(x))$
4. $\forall x\ [(M(x) \wedge D(x)) \to \neg \exists y (\neg C(y) \wedge A(x,y))]$
5. $\exists x\ \neg C(x)$

Negamos la conclusión.

$$\neg \exists x \, (M(x) \land \neg D(x))$$

$$\forall x \, \neg (M(x) \land \neg D(x)) \quad \text{FNP FNS}$$

$$\forall x \, (\neg M(x) \lor D(x)) \quad \text{FNC (1 cláusula).}$$

Trasformamos en cláusulas las 5 hipótesis

1. $\forall y \, \exists x \, (\neg C(y) \to A(x,y))$ FNP

$\forall y \, (\neg C(y) \to A(f(y), y))$ FNS

$\forall y \, (C(y) \lor A(f(y), y))$ FNC.

2. $\forall x \, \forall y \, (\neg C(y) \land A(x,y) \to M(x))$ FNP FNS

$\forall x \, \forall y \, (C(y) \lor \neg A(x,y) \lor M(x))$ FNC

3. $\forall x \, (D(x) \to M(x))$ FND FNS

$\forall x \, (\neg D(x) \lor M(x))$ FNC

4. $\forall x \, \forall y \, (M(x) \land D(x) \to \neg(\neg C(y) \land A(x,y)))$ FNP FNS

$\forall x \, \forall y \, (\neg M(x) \lor \neg D(x) \lor C(y) \lor \neg A(x,y))$ FNC.

5. $\neg C(a)$ FNC

$\{\neg C(a), \neg M(x) \lor \neg D(x) \lor C(y) \lor \neg A(x,y), \neg D(x) \lor M(x),$

$C(y) \lor \neg A(x,y) \lor M(x), \; C(y) \lor A(f(y), y), \; \neg M(x) \lor D(x)\}.$

$\neg M(x) \vee \neg D(x) \vee C(y) \vee \neg A(x,y)$

$\neg M(x) \vee D(x)$

$\neg M(x) \vee C(y) \vee \neg A(x,y)$

$C(y) \vee \neg A(x,y) \vee M(x)$

$C(y) \vee \neg A(x,y)$

$C(y) \vee A(f(y),y)$

$x|f(y)$

$C(y)$

$y|a$

$\neg C(a)$

$\square$