César Vásquez. 22-10-20

Segundo Parcial.

1. $$\frac{\phi \to \psi}{(\phi \wedge \neg\psi) \to \textit{false}}$$

0. $\phi \to \psi$ < Hipotesis 1. >

1. $((\phi \to \psi) \to ((\phi \wedge \neg\psi) \to (\psi \wedge (\neg\psi)))$ < Teorema demostrado en ejercicio 41 >

2. $((\phi \wedge \neg\psi) \to (\psi \wedge (\neg\psi)))$ < R. Modus Ponens en 0 y 1 >

3. $(\psi \wedge (\neg\psi) \equiv \textit{false}.$ < T.4.25.1 >

4. $((\phi \wedge \neg\psi) \to (\psi \wedge (\neg\psi) \equiv (\phi \wedge \neg\psi) \to \textit{false}$ < Leibniz en 3 >

5. $((\phi \wedge \neg\psi) \to \textit{false}.$ < Ecuanimidad entre 2 y 4 >

2.

ⓐ $\vdash_{ps} (\phi \wedge (\psi \equiv T)) \equiv ((\phi \wedge \psi) \equiv (\phi \wedge T) \equiv \phi))$

$(\phi \wedge (\psi \equiv T))$

$\equiv \langle Ax 11 \quad \psi := (\psi \equiv T) \rangle$

$(\phi \equiv (\psi \equiv T) \equiv (\phi \vee (\psi \equiv T))$

$\equiv \langle$ Leibniz $Ax 8, \quad \phi := (\phi \equiv ((\psi \equiv T) \equiv p) \equiv p)) \rangle$

$(\phi \equiv ((\psi \equiv T) \equiv ((\phi \vee \psi) \equiv (\phi \vee T))$

$\equiv \langle Ax 1 \quad \phi \equiv \psi, \psi \equiv T, T \equiv (\phi \vee \psi)$.

$\phi \equiv (\psi \equiv (T \equiv (\psi \vee T) \equiv (\phi \vee T))))$

$\equiv \langle$ Leibniz $Ax 1 \; \phi := (\phi \vee \psi), \psi = T, T (\phi \vee T) \rangle$

$(\phi \equiv (\psi \equiv (\phi \vee \psi) \equiv (T \equiv (\phi \vee T)))$

$\equiv \langle Ax 1 \quad \psi := (\psi \equiv (\phi \vee T)), T := (T \equiv (\phi \vee T))) \rangle$

$(\phi \equiv (\psi \equiv (\phi \vee \psi) \equiv (T \equiv (\phi \vee T))$

$\equiv \langle$ Leibniz $Ax 11, \phi := (p \equiv (T \equiv (\phi \vee T)))$

$(\phi \wedge \psi) \equiv (T \equiv (\phi \vee T))$

$\equiv \langle$ Leibniz $\phi := (\phi \equiv p) \rangle$

$(\phi \equiv (\phi \wedge \psi)) \equiv (\phi \equiv T \equiv (\phi \vee T)))$

$\equiv \langle$ Leibniz $Ax 11, \psi := T, \phi := ((\phi \equiv (\phi \wedge \psi) \equiv p) \rangle$

$(\phi \equiv (\phi \wedge \psi) \equiv (\phi \wedge T)$

$\equiv \langle Ax 1 \quad \psi := (\phi \wedge \psi), T := (\phi \wedge T) \rangle$

$((\phi \equiv (\phi \wedge \psi) \equiv (\phi \wedge T)))$

(b) Si $\vdash_{DS} (\phi \equiv \psi)$ entonces $\vdash_{DS} (\phi \to \psi)$

0. $(\phi \equiv \psi)$ < Hipotesis 1 >

1. $(\phi \equiv \psi) \equiv ((\phi \to \psi) \wedge (\psi \to \phi))$ < T.4.31.3 >

2. $((\phi \to \psi) \wedge (\psi \to \phi))$ < Ecuanimidad entre 0 y 1 >

3. $(\phi \to \psi)$ < R. debilitamiento en 2 >

Entonces $\vdash_{DS} (\phi \to \psi)$

Escaneado con CamScanner

(c) $\vdash_{DS} (\phi \equiv (\psi \equiv ((\phi \wedge \psi) \vee (\neg \phi \wedge \neg \psi))))$

$\psi \equiv ((\phi \wedge \psi) \vee (\neg \phi \wedge \neg \psi))$

$\equiv \langle$ Leibniz en $(\neg \phi \wedge \neg \psi) \equiv (\neg (\phi \vee \psi)) \rangle$

$\psi \equiv ((\phi \wedge \psi) \vee (\neg (\phi \vee \psi))$

$\equiv \langle$ Leibniz Ax11 $\rangle$

$\psi \equiv ((\phi \equiv (\psi \equiv (\phi \vee \psi) \vee (\neg (\phi \vee \psi)))$

$\equiv \langle$ Leibniz $(\phi \vee \neg \phi) \equiv$ true $\rangle$

$\psi \equiv ((\phi \equiv (\psi \equiv$ true$)$

$\equiv \langle$ Leibniz en $(\psi \equiv \psi) \equiv$ true $\rangle$

true $\equiv \phi \equiv$ true

$\equiv \langle$ Leibniz (true $\equiv$ true$) \equiv$ true $\rangle$

$\phi \equiv$ true

$\equiv \langle$ Ax3 $\rangle$

ϕ.

T.4.19.1.

Si $\vdash_{DS} (\phi \vee \psi) \vee (\neg (\phi \vee \psi))$

entonces $\vdash_{DS} (\phi \vee \psi) \vee (\neg (\phi \vee \psi)) \equiv$ true

(d) $\vdash_{DS} ((\phi \equiv ((\phi \vee (\phi \rightarrow false))) \equiv \phi))$

$(\phi \equiv ((\phi \vee (\phi \rightarrow false)))$

$\equiv \langle$ Leibniz $(\phi \rightarrow false) \equiv (\neg \phi)$ $\rangle$

$(\phi \equiv ((\phi \vee (\neg \phi)))$

$\equiv \langle$ Leibniz $(\phi \vee \neg \phi)$ $\rangle$

$\phi \equiv true.$

$\equiv \langle$ Ax 3 $\rangle$

$\phi.$

T. 4.19.1.

Si $\vdash_{DS} (\phi \vee \neg \phi)$ entonces

$\vdash_{DS} ((\phi \vee \neg \phi) \equiv true)$