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## Ejercicio 3

$$\langle \forall x :: \neg(\underline{P.x \implies Q.x}) \rangle \vee \langle \exists x :: False \wedge P.x \rangle \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Caract. Implicación P:=P.x; Q:=Q.x}\}$$

$$\langle \forall x :: \neg(\neg P.x \vee Q.x) \rangle \vee \langle \exists x :: \underline{False \wedge P.x} \rangle \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Conmut. Conjuncion P:=False; Q:=P.x}\}$$

$$\langle \forall x :: \neg(\neg P.x \vee Q.x) \rangle \vee \langle \exists x :: \underline{P.x \wedge False} \rangle \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Elem. Absorbente Conjuncion P:=P.x}\}$$

$$\langle \forall x :: \neg(\neg P.x \vee Q.x) \rangle \vee \underline{\langle \exists x :: False \rangle} \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Termino Constante } \exists\text{, C:=False}\}$$

$$\underline{\langle \forall x :: \neg(\neg P.x \vee Q.x) \rangle \vee False} \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Elem. Neutro Disyuncion P:=}\langle \forall x :: \neg(\neg P.x \vee Q.x) \rangle\}$$

$$\langle \forall x :: \underline{\neg(\neg P.x \vee Q.x)} \rangle \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{De Morgan P:=}\neg P.x \text{ Q:=Q.x}\}$$

$$\langle \forall x :: \underline{\neg\neg P.x} \wedge \neg Q.x) \rangle \equiv (\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle$$

$$\equiv \{\text{Doble negacion, P:=P.x}\}$$

$$\langle \forall x :: P.x \wedge \neg Q.x) \rangle \equiv \underline{(\langle \forall x :: P.x \rangle \wedge \langle \forall x :: \neg Q.x \rangle}$$

$$\equiv \{\text{Regla de termino de } \forall \text{ t:=P; s:=}\neg Q\}$$

$$\underline{\langle \forall x :: P.x \wedge \neg Q.x) \rangle \equiv (\langle \forall x :: P.x \wedge \neg Q.x \rangle}$$

$$\equiv \{\text{Reflexividad equivalencia}\}$$

$$True$$