Primeira Prova de Lógica para Computação:

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$E_1 : (P_1 \lor P_2)$

$E_2 : ((P_2 \to P_3)$ → suficiente, fica a esquerda

$E_3 : (P_4 \to (\neg P_3))$

$E_4 : \; P_4$

$G : (P_1 \to P_3)$

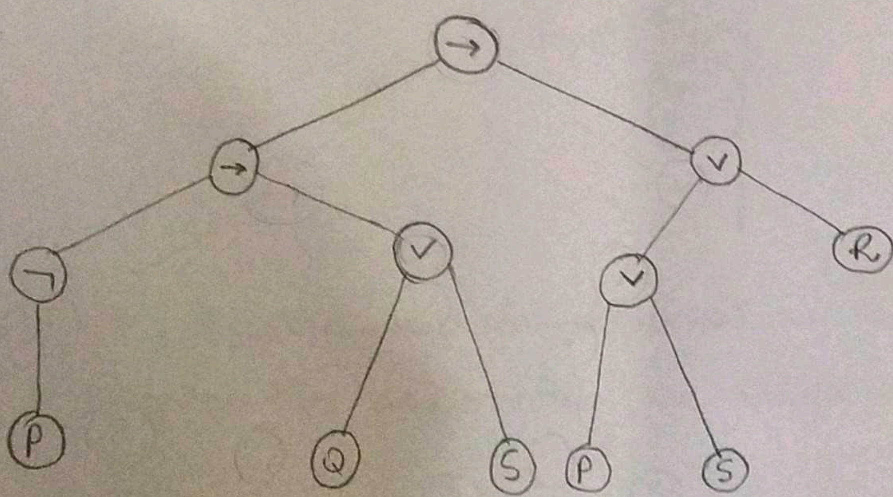
2 $H : (((\neg P) \to (Q \lor (R \lor S))) \to ((P \lor S) \lor R))$

a)

(i) $\neg P \to Q \lor (R \lor S) \to P \lor S \lor R$

(ii) $(\neg P \to Q \lor (R \lor S)) \to P \lor S \lor R$

b) $(((\neg P) \to (Q \lor (R \lor S))) \to ((P \lor S) \lor R))$



(3) $((P \to Q) \to ((\neg P) \vee Q))$

$\text{Eval}(((P \to Q) \to ((\neg P) \vee Q)), w)$

$= \bar{w}((P \to Q) \to ((\neg P) \vee Q))$

$= \varphi^{\to}(\bar{w}(P \to Q), \bar{w}((\neg P) \vee Q))$

$= \varphi^{\to}(\varphi^{\to}(\bar{w}(P), \bar{w}(Q)), \varphi^{\vee}(\bar{w}(\neg P), \bar{w}(Q)))$

$= \varphi^{\to}(\varphi^{\to}(\bar{w}(P), \bar{w}(Q)), \varphi^{\vee}(\varphi^{\neg}(\bar{w}(P)), \bar{w}(Q)))$

* para $\bar{w}(P) = T$
$\bar{w}(Q) = T$

$= \varphi^{\to}(\varphi^{\to}(T, T), \varphi^{\vee}(\varphi^{\neg}(T), T))$

$= \varphi^{\to}(T, \varphi^{\vee}(F, T))$

$= \varphi^{\to}(T, T)$

$= T$

* para $\bar{w}(P) = T$
$\bar{w}(Q) = F$

$= \varphi^{\to}(\varphi^{\to}(T, F), \varphi^{\vee}(\varphi^{\neg}(T), F))$

$= \varphi^{\to}(F, \varphi^{\vee}(F, F))$

$= \varphi^{\to}(F, F)$

$= T$

* para $\bar{w}(P) = F$
* para $\bar{w}(Q) = T$

$= \varphi^{\to}(\varphi^{\to}(F, T), \varphi^{\vee}(\varphi^{\neg}(F), T))$

$= \varphi^{\to}(F, \varphi^{\vee}(T, T))$

$= \varphi^{\to}(F, T)$

$= T$

* para: $\bar{w}(P) = \bar{w}(Q) = F$

$= \varphi^{\to}(\varphi^{\to}(F, F), \varphi^{\vee}(\varphi^{\neg}(F), F))$

$= \varphi^{\to}(T, \varphi^{\vee}(T, F))$

$= \varphi^{\to}(T, T)$

$= T$

↳ Para todos os valores e combinações possíveis de $\bar{w}(P)$ e $\bar{w}(Q)$, comprova-se que a fórmula é uma tautologia.

④ $((P \to Q) \to ((\neg P) \vee Q))$

P	Q	$\neg P$	$P \to Q$	$\neg P \vee Q$	Fórmula
T	T	F	T	T	T
T	F	F	F	F	T
F	T	T	T	T	T
F	F	T	T	T	T
					T

* A fórmula é uma tautologia

⑤ $((P \to Q) \to ((\neg P) \vee Q))$