Hoja de trabajo #3

Ejercicio #1

Realzar $[s(s(s(0)))] \oplus [s(s(s(s(0))))]$ paso por paso:

$$\text{Empezamos con } [s(s(s(0)))] \oplus [s(s(s(s(0))))]$$

$$\rightarrow s[s(s(0) \oplus s(s(s(s(0)))))]$$

$$\rightarrow s[s[s(0) \oplus s(s(s(s(0))))]]$$

$$\rightarrow s[s[s[0 \oplus s(s(s(s(0))))]]]$$

$$\rightarrow s[s[s[s(s(s(s(0))))]]]$$

$$\rightarrow s(s(s(s(s(s(s(0)))))))$$

Ejercicio #2

Definicion de multiplicacion para numeros unarios ($\otimes$):

$$n \otimes m = \begin{cases} 0 & \text{si } n = 0 \\ 0 & \text{si } m = 0 \\ n \oplus (n \otimes i) & \text{si } m = s(i) \end{cases}$$

Ejercicio #3

Verificacion de la definicion de la multiplicacion del problema #2:

$s(s(s(0))) \otimes 0$:

$$s(s(s(0))) \otimes 0 = 0 \text{ Por la segunda propiedad: } n \otimes m = 0 \text{ si } m = 0$$

$s(s(s(0))) \otimes s(0)$:

$$s(s(s(0))) \otimes s(0)$$

$$\rightarrow s(s(s(0))) \oplus [s(s(s(0))) \otimes 0]$$

Por la definicion sabemos que el resultado del lado derecho de la *suma* es 0

$$\rightarrow s(s(s(0))) \oplus 0$$

$$\rightarrow s(s(s(0)))$$

$s(s(s(0))) \otimes s(s(0))$:

$$s(s(s(0))) \otimes s(s(0))$$

$$\rightarrow s(s(s(0))) \oplus [s(s(s(0))) \oplus s(0)]$$

$$\rightarrow s(s(s(0))) \oplus [s(s(s(0))) \oplus [s(s(s(0))) \otimes 0]]$$

$$\rightarrow s(s(s(0))) \oplus [s(s(s(0))) \oplus 0]$$

$$\rightarrow s(s(s(0))) \oplus s(s(s(0))$$

$$\rightarrow s[s(s(0)) \oplus s(s(s(0)))]$$

$$\rightarrow s[s[s(0) \oplus s(s(s(0)]]$$

$$\rightarrow s[s[s[0 \oplus s(s(s(0))]]]$$

$$\rightarrow s[s[s[s(s(s(0)))]]]$$

$$\rightarrow s(s(s(s(s(s(0))))))$$

Ejercicio #4

$a \oplus s(s(0)) = s(s(a))$:

Tomamos la parte derecha de la igualdad y la modificamos de la siguiente forma:

$$\rightarrow a \oplus s(s(0))$$

$$\rightarrow s(s(0)) \oplus a$$

$$\rightarrow s[s(0) + a]$$

$$\rightarrow s[s[0 + a]]$$

Por definicion de la suma sabemos que $0 + a = a$

$$\rightarrow s[s(a)]$$

$$\rightarrow s(s(a)) = s(s(a))$$

$a \otimes b = b \otimes a$:

No pude :'(

$a \otimes (b \otimes c) = (a \otimes b) \otimes c$

Esta tampoco :'(

$(a \oplus b) \otimes c = (a \otimes c) \oplus (b \otimes c)$

Esta menos :'(