

t28\_gate\_1  
(TMZye7YDRW4c12WNvcRw4u87FxJPr3zXbrS)

October 27, 2020

Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k22\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k14\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_gate\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.(\neg v1\_xboole\_0 (k14\_gate\_1 X0 X1 X2 X3)) \Leftrightarrow ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge (\neg v1\_xboole\_0 X3)))) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & (\neg(\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge \\ & ((\neg v1\_xboole\_0 X3) \wedge ((\neg v1\_xboole\_0 X4) \wedge ((\neg v1\_xboole\_0 X5) \wedge ( \\ & k22\_gate\_1 X0 X1 X2 X3 X4 X5 \neq k1\_gate\_1 k1\_xboole\_0))))))) \wedge ((\neg( \\ & \neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge ((\neg \\ & v1\_xboole\_0 X3) \wedge ((\neg v1\_xboole\_0 X4) \wedge (\neg v1\_xboole\_0 X5)))))) \Rightarrow \\ & (k22\_gate\_1 X0 X1 X2 X3 X4 X5 = k1\_xboole\_0)) \quad (2) \end{aligned}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(\neg(\neg v1\_xboole\_0 \\ & X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge ((\neg v1\_xboole\_0 X3) \wedge \\ & (k14\_gate\_1 X0 X1 X2 X3 \neq k1\_gate\_1 k1\_xboole\_0)))))) \wedge ((\neg(\neg v1\_xboole\_0 \\ & X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge (\neg v1\_xboole\_0 X3)))) \Rightarrow \\ & (k14\_gate\_1 X0 X1 X2 X3 = k1\_xboole\_0)) \quad (3) \end{aligned}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & (\neg v1\_xboole\_0 (k22\_gate\_1 X0 X1 X2 X3 X4 X5)) \Leftrightarrow ((\neg v1\_xboole\_0 X0) \wedge \\ & ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge ((\neg v1\_xboole\_0 X3) \wedge ( \\ & (\neg v1\_xboole\_0 X4) \wedge (\neg v1\_xboole\_0 X5))))))) \end{aligned}$$