

t6\_cat\_4  
(TMcAkXqDgyfNgdXLxu7K2P2FZaokHeiupXF)

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Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k5\_cat\_4 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v7\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v15\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_cat\_4 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_4 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0. \forall X1. \neg (X0 \in X1) \wedge (v1\_xboole\_0 X1) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (u1\_struct\_0 \\ & (k5\_cat\_4 X0 X1))) \Rightarrow (\forall X3. (m1\_subset\_1 X3 (u1\_struct\_0 ( \\ & k5\_cat\_4 X0 X1))) \Rightarrow (\forall X4. (m1\_subset\_1 X4 (u4\_struct\_0 (k5\_cat\_4 \\ & X0 X1))) \Rightarrow (X4 \in k2\_cat\_1 (k5\_cat\_4 X0 X1) X2 X3))) \end{aligned} \quad (2)$$

Assume the following.

$$v1\_xboole\_0 k1\_xboole\_0 \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v2\_struct\_0 (k5\_cat\_4 X0 X1)) \wedge ((v7\_struct\_0 \\ & (k5\_cat\_4 X0 X1)) \wedge ((\neg v11\_struct\_0 (k5\_cat\_4 X0 X1)) \wedge ((v15\_struct\_0 \\ & (k5\_cat\_4 X0 X1)) \wedge (v2\_cat\_4 (k5\_cat\_4 X0 X1)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0. (l1\_cat\_4 X0) \Rightarrow (l1\_cat\_1 X0) \quad (5)$$

Assume the following.

$$\forall X0. \forall X1. (v2\_cat\_4 (k5\_cat\_4 X0 X1)) \wedge (l1\_cat\_4 (k5\_cat\_4 X0 X1)) \quad (6)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\
& X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow \\
& (\forall X3.(m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow ((m1\_cat\_1 X3 X0 \\
& X1 X2) \Leftrightarrow (X3 \in k2\_cat\_1 X0 X1 X2))))))
\end{aligned} \tag{7}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\
& (k5\_cat\_4 X0 X1))) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 ( \\
& k5\_cat\_4 X0 X1))) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u4\_struct\_0 (k5\_cat\_4 \\
& X0 X1))) \Rightarrow (m1\_cat\_1 X4 (k5\_cat\_4 X0 X1) X2 X3)))
\end{aligned}$$