

t21_cat_4 (TM-
VAa5x8vmMrRMVhByQYgiUGxZrGQBJdAkG)

October 27, 2020

Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $v11_struct_0 : \iota \Rightarrow o$ be given. Let $v2_cat_1 : \iota \Rightarrow o$ be given. Let $v3_cat_1 : \iota \Rightarrow o$ be given. Let $v4_cat_1 : \iota \Rightarrow o$ be given. Let $v5_cat_1 : \iota \Rightarrow o$ be given. Let $v6_cat_1 : \iota \Rightarrow o$ be given. Let $v3_cat_4 : \iota \Rightarrow o$ be given. Let $l1_cat_4 : \iota \Rightarrow o$ be given. Let $v1_cat_4 : \iota \Rightarrow o$ be given. Let $l1_cat_1 : \iota \Rightarrow o$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $v10_cat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u4_struct_0 : \iota \Rightarrow \iota$ be given. Let $k3_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4_graph_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r2_cat_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $u4_cat_4 : \iota \Rightarrow \iota$ be given. Let $v1_funct_2 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_zfmisc_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_zfmisc_1 : \iota \Rightarrow \iota$ be given. Let $u3_cat_4 : \iota \Rightarrow \iota$ be given. Let $u2_cat_4 : \iota \Rightarrow \iota$ be given. Let $u1_cat_4 : \iota \Rightarrow \iota$ be given. Let $l5_struct_0 : \iota \Rightarrow o$ be given. Let $l1_graph_1 : \iota \Rightarrow o$ be given. Let $k5_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_cat_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 \\
& X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 \\
& X0) \wedge (l1_cat_1 X0)))))) \Rightarrow ((v1_cat_4 X0) \Leftrightarrow ((\exists X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \wedge (v10_cat_1 X1 X0)) \wedge (\forall X1.(m1_subset_1 \\
& X1 (u1_struct_0 X0)) \Rightarrow (\forall X2.(m1_subset_1 X2 (u1_struct_0 \\
& X0)) \Rightarrow (\exists X3.(m1_subset_1 X3 (u1_struct_0 X0)) \wedge (\exists X4. \\
& (m1_subset_1 X4 (u4_struct_0 X0)) \wedge (\exists X5.(m1_subset_1 X5 \\
& (u4_struct_0 X0)) \wedge ((k3_graph_1 X0 X4 = X3) \wedge ((k3_graph_1 X0 X5 = \\
& X3) \wedge ((k4_graph_1 X0 X4 = X1) \wedge ((k4_graph_1 X0 X5 = X2) \wedge (r2_cat_3 \\
& X0 X3 X4 X5)))))))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0) \wedge (l1_struct_0 X0)) \Rightarrow (\neg v1_xboole_0 (u1_struct_0 X0)) \tag{2}$$

Assume the following.

$$\begin{aligned} \forall X0.(l1_cat_4 X0) \Rightarrow & ((v1_funct_1 (u4_cat_4 X0)) \wedge ((v1_funct_2 \\ & (u4_cat_4 X0) (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) \\ & (u4_struct_0 X0)) \wedge (m1_subset_1 (u4_cat_4 X0) (k1_zfmisc_1 (k2_zfmisc_1 \\ & (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) (u4_struct_0 \\ & X0)))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1_cat_4 X0) \Rightarrow & ((v1_funct_1 (u3_cat_4 X0)) \wedge ((v1_funct_2 \\ & (u3_cat_4 X0) (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) \\ & (u4_struct_0 X0)) \wedge (m1_subset_1 (u3_cat_4 X0) (k1_zfmisc_1 (k2_zfmisc_1 \\ & (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) (u4_struct_0 \\ & X0)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1_cat_4 X0) \Rightarrow & ((v1_funct_1 (u2_cat_4 X0)) \wedge ((v1_funct_2 \\ & (u2_cat_4 X0) (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) \\ & (u1_struct_0 X0)) \wedge (m1_subset_1 (u2_cat_4 X0) (k1_zfmisc_1 (k2_zfmisc_1 \\ & (k2_zfmisc_1 (u1_struct_0 X0) (u1_struct_0 X0)) (u1_struct_0 \\ & X0)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.(l1_cat_4 X0) \Rightarrow (m1_subset_1 (u1_cat_4 X0) (u1_struct_0 X0)) \quad (6)$$

Assume the following.

$$\forall X0.(l5_struct_0 X0) \Rightarrow (l1_struct_0 X0) \quad (7)$$

Assume the following.

$$\forall X0.(l1_graph_1 X0) \Rightarrow (l5_struct_0 X0) \quad (8)$$

Assume the following.

$$\forall X0.(l1_cat_4 X0) \Rightarrow (l1_cat_1 X0) \quad (9)$$

Assume the following.

$$\forall X0.(l1_cat_1 X0) \Rightarrow (l1_graph_1 X0) \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3. & (((v1_funct_1 X1) \wedge \\ & ((v1_funct_2 X1 (k2_zfmisc_1 X0 X0) X0) \wedge (m1_subset_1 X1 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X0 X0) X0)))))) \wedge ((m1_subset_1 X2 X0) \wedge \\ & (m1_subset_1 X3 X0))) \Rightarrow (m1_subset_1 (k5_binop_1 X0 X1 X2 X3) X0) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\
& ((\neg v1_xboole_0 X0) \wedge ((\neg v1_xboole_0 X1) \wedge (((v1_funct_1 X3) \wedge ((v1_funct_2 X3 (k2_zfmisc_1 X0 X1) X2) \wedge (m1_subset_1 X3 (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 X0 X1) X2)))) \wedge ((m1_subset_1 X4 X0) \wedge (m1_subset_1 X5 X1)))))) \Rightarrow (m1_subset_1 (k2_binop_1 X0 X1 X2 X3 X4 X5) X2)
\end{aligned} \tag{12}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 X0) \wedge (l1_cat_4 X0)))))))) \Rightarrow ((v3_cat_4 X0) \Leftrightarrow ((v10_cat_1 (u1_cat_4 X0) X0) \wedge (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. (m1_subset_1 X2 (u1_struct_0 X0)) \Rightarrow ((k4_graph_1 X0 (k2_binop_1 (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u3_cat_4 X0) X1 X2) = X1) \wedge ((k4_graph_1 X0 (k2_binop_1 (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u4_cat_4 X0) X1 X2) = X2) \wedge (r2_cat_3 X0 (k5_binop_1 (u1_struct_0 X0) (u2_cat_4 X0) X1 X2) (k2_binop_1 (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u3_cat_4 X0) X1 X2) (k2_binop_1 (u1_struct_0 X0) (u1_struct_0 X0) (u4_struct_0 X0) (u4_cat_4 X0) X1 X2))))))))))
\end{aligned} \tag{13}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 X0) \wedge (l1_cat_1 X0)))))))) \Rightarrow (\forall X1. (m1_subset_1 X1 (u1_struct_0 X0)) \Rightarrow (\forall X2. (m1_subset_1 X2 (u4_struct_0 X0)) \Rightarrow (\forall X3. (m1_subset_1 X3 (u4_struct_0 X0)) \Rightarrow ((r2_cat_3 X0 X1 X2 X3) \Leftrightarrow ((k3_graph_1 X0 X2 = X1) \wedge ((k3_graph_1 X0 X3 = X1) \wedge (\forall X4. (m1_subset_1 X4 (u1_struct_0 X0)) \Rightarrow (\forall X5. (m1_subset_1 X5 (u4_struct_0 X0)) \Rightarrow (\forall X6. (m1_subset_1 X6 (u4_struct_0 X0)) \Rightarrow (\neg (X5 \in k2_cat_1 X0 X4 (k4_graph_1 X0 X2) \wedge ((X6 \in k2_cat_1 X0 X4 (k4_graph_1 X0 X3)) \wedge (\forall X7. (m1_subset_1 X7 (u4_struct_0 X0)) \Rightarrow (\neg (X7 \in k2_cat_1 X0 X4 X1) \wedge (\forall X8. (m1_subset_1 X8 (u4_struct_0 X0)) \Rightarrow ((X8 \in k2_cat_1 X0 X4 X1) \Rightarrow (((k1_cat_1 X0 X8 X2 = X5) \wedge (k1_cat_1 X0 X8 X3 = X6)) \Leftrightarrow (X7 = X8))))))))))))))))))
\end{aligned} \tag{14}$$

Theorem 1

$$\forall X0. ((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v2_cat_1 X0) \wedge ((v3_cat_1 X0) \wedge ((v4_cat_1 X0) \wedge ((v5_cat_1 X0) \wedge ((v6_cat_1 X0) \wedge ((v3_cat_4 X0) \wedge (l1_cat_4 X0)))))))) \Rightarrow (v1_cat_4 X0)$$