

# t18\_catalg\_1

(TMY5hoQVE9LeGyoZxyTHyf4t9sT8dCpRTCY)

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Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_catalg\_1 : \iota \Rightarrow \iota$  be given. Let  $k8\_catalg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k2\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_catalg\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_catalg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_catalg\_1 : \iota \Rightarrow \iota$  be given. Let  $k6\_numbers : \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_finseq\_2 : \iota \Rightarrow \iota$  be given. Let  $k13\_finseq\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_catalg\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v1\_instalg1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v3\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l5\_struct\_0 : \iota \Rightarrow o$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $u2\_msualg\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u1\_msualg\_1 : \iota \Rightarrow \iota$  be given. Let  $m1\_catalg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k10\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $k9\_finseq\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_tarski : \iota \Rightarrow \iota$  be given. Let  $k4\_finseq\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_2 : \iota$  be given. Let  $k2\_xboole\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_3 : \iota$  be given. Let  $k11\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0. \forall X1. (m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. ((\neg v1\_xboole\_0 X0) \wedge ((m1\_subset\_1 X1 X0) \wedge (m1\_subset\_1 X2 X0))) \Rightarrow (k9\_catalg\_1 X0 X1 X2 = k6\_catalg\_1 X1 X2) \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. ((\neg v1\_xboole\_0 X0) \wedge (m1\_subset\_1 X1 X0)) \Rightarrow (k8\_catalg\_1 X0 X1 = k5\_catalg\_1 X1) \quad (3)$$

Assume the following.

$$k6\_numbers = k1\_xboole\_0 \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & (((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X0 X1)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X0 X1))))))\wedge(m1\_subset\_1 X3 X0)))\Rightarrow(k3\_funct\_2 X0 \\ & X1 X2 X3 = k1\_funct\_1 X2 X3) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.k3\_finseq\_2 X0 = k13\_finseq\_1 X0 \quad (6)$$

Assume the following.

$$\forall X0.k3\_catalg\_1 X0 = k2\_catalg\_1 X0 \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.\neg v1\_xboole\_0 (k2\_tarski X0 X1) \quad (8)$$

Assume the following.

$$\forall X0.(v1\_msualg\_1 (k2\_catalg\_1 X0)\wedge(v1\_instalg1 (k2\_catalg\_1 X0))) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.((v1\_relat\_1 X0)\wedge((v3\_relat\_1 X0)\wedge(v1\_funct\_1 X0)))\Rightarrow(v1\_xboole\_0 (k1\_funct\_1 X0 X1)) \quad (10)$$

Assume the following.

$$\forall X0.((v11\_struct\_0 X0)\wedge(l5\_struct\_0 X0))\Rightarrow(v1\_xboole\_0 (u4\_struct\_0 X0)) \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.(l1\_msualg\_1 X0)\Rightarrow((v1\_funct\_1 (u2\_msualg\_1 X0))\wedge \\ & ((v1\_funct\_2 (u2\_msualg\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0))\wedge \\ & (m1\_subset\_1 (u2\_msualg\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 \\ & X0) (u1\_struct\_0 X0)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0.(l1\_msualg\_1 X0)\Rightarrow((v1\_funct\_1 (u1\_msualg\_1 X0))\wedge \\ & ((v1\_funct\_2 (u1\_msualg\_1 X0) (u4\_struct\_0 X0) (k3\_finseq\_2 ( \\ & u1\_struct\_0 X0)))\wedge(m1\_subset\_1 (u1\_msualg\_1 X0) (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 (u4\_struct\_0 X0) (k3\_finseq\_2 (u1\_struct\_0 X0)))))) \end{aligned} \quad (13)$$

Assume the following.

$$\forall X0.(l1\_msualg\_1 X0) \Rightarrow (l5\_struct\_0 X0) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1\_xboole\_0 X0) \wedge (m1\_subset\_1 X1 X0)) \Rightarrow (m1\_subset\_1 (k8\_catalg\_1 X0 X1) (u4\_struct\_0 (k3\_catalg\_1 X0))) \quad (15)$$

Assume the following.

$$\forall X0.(v1\_msualg\_1 (k3\_catalg\_1 X0)) \wedge (m1\_catalg\_1 (k3\_catalg\_1 X0) X0) \quad (16)$$

Assume the following.

$$\forall X0.(v1\_msualg\_1 (k2\_catalg\_1 X0)) \wedge (l1\_msualg\_1 (k2\_catalg\_1 X0)) \quad (17)$$

Assume the following.

$$\forall X0.\forall X1.k6\_catalg\_1 X0 X1 = k4\_tarski k6\_numbers (k10\_finseq\_1 X0 X1) \quad (18)$$

Assume the following.

$$\forall X0.k5\_catalg\_1 X0 = k4\_tarski np\_1 (k9\_finseq\_1 X0) \quad (19)$$

Assume the following.

$$\forall X0.\forall X1.k4\_tarski X0 X1 = k2\_tarski (k2\_tarski X0 X1) (k1\_tarski X0) \quad (20)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1\_msualg\_1 X1) \wedge (l1\_msualg\_1 X1)) \Rightarrow ( \\ & (X1 = k2\_catalg\_1 X0) \Leftrightarrow ((u1\_struct\_0 X1 = k2\_zfmisc\_1 (k1\_tarski \\ & k6\_numbers) (k4\_finseq\_2 np\_2 X0)) \wedge ((u4\_struct\_0 X1 = k2\_xboole\_0 \\ & (k2\_zfmisc\_1 (k1\_tarski np\_1) (k4\_finseq\_2 np\_1 X0)) (k2\_zfmisc\_1 \\ & (k1\_tarski np\_2) (k4\_finseq\_2 np\_3 X0))) \wedge ((\forall X2.(X2 \in \\ & X0) \Rightarrow ((k1\_funct\_1 (u1\_msualg\_1 X1) (k4\_tarski np\_1 (k9\_finseq\_1 \\ & X2)) = k1\_xboole\_0) \wedge (k1\_funct\_1 (u2\_msualg\_1 X1) (k4\_tarski np\_1 \\ & (k9\_finseq\_1 X2)) = k4\_tarski k6\_numbers (k10\_finseq\_1 X2 X2)))) \wedge \\ & (\forall X2.\forall X3.\forall X4.((X2 \in X0) \wedge ((X3 \in X0) \wedge (X4 \in X0))) \Rightarrow \\ & ((k1\_funct\_1 (u1\_msualg\_1 X1) (k4\_tarski np\_2 (k11\_finseq\_1 \\ & X2 X3 X4)) = k10\_finseq\_1 (k4\_tarski k6\_numbers (k10\_finseq\_1 X3 \\ & X4)) (k4\_tarski k6\_numbers (k10\_finseq\_1 X2 X3))) \wedge (k1\_funct\_1 \\ & (u2\_msualg\_1 X1) (k4\_tarski np\_2 (k11\_finseq\_1 X2 X3 X4)) = k4\_tarski \\ & k6\_numbers (k10\_finseq\_1 X2 X4)))))) \end{aligned} \quad (21)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k2\_msualg\_1 \\ X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u2\_msualg\_1 \\ X0) X1)) \end{aligned} \quad (22)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k1\_msualg\_1 \\ X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (k3\_finseq\_2 (u1\_struct\_0 X0) \\ (u1\_msualg\_1 X0) X1))) \end{aligned} \quad (23)$$

Assume the following.

$$\forall X0.(l1\_msualg\_1 X0) \Rightarrow (((v2\_struct\_0 X0) \wedge (v1\_instalg1 \\ X0)) \Rightarrow (v11\_struct\_0 X0)) \quad (24)$$

Assume the following.

$$\forall X0.\forall X1.(v1\_xboole\_0 X0) \Rightarrow (\forall X2.(m1\_subset\_1 \\ X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \Rightarrow (v1\_xboole\_0 X2)) \quad (25)$$

Assume the following.

$$\forall X0.((v1\_xboole\_0 X0) \wedge (v1\_relat\_1 X0)) \Rightarrow ((v1\_relat\_1 \\ X0) \wedge (v3\_relat\_1 X0)) \quad (26)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0 X0) \Rightarrow (v1\_relat\_1 X0) \quad (27)$$

**Theorem 1**

$$\begin{aligned} \forall X0.(\neg v1\_xboole\_0 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 X0) \Rightarrow \\ ((k1\_msualg\_1 (k3\_catalg\_1 X0) (k8\_catalg\_1 X0 X1) = k1\_xboole\_0) \wedge \\ (k2\_msualg\_1 (k3\_catalg\_1 X0) (k8\_catalg\_1 X0 X1) = k9\_catalg\_1 \\ X0 X1 X1))) \end{aligned}$$