

t4\_index\_1 (TM-  
RZbs5zq91E8meYm9KA18UvmsGhFHDIwwM)

October 27, 2020

Let  $v1\_xboole\_0 : \iota \Rightarrow o$  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  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m3\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k2\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_index\_1 : \iota \Rightarrow o$  be given. Let  $m2\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k7\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow (\forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((X0 \in k9\_xtuple\_0 (k3\_relat\_1 \\ & X2 X1)) \Rightarrow (k1\_funct\_1 (k3\_relat\_1 X2 X1) X0 = k1\_funct\_1 X1 (k1\_funct\_1 \\ & X2 X0)))) \quad (2) \end{aligned}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. ((\neg v1\_xboole\_0 \\ & X0) \wedge (((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge ((v1\_funct\_1 X1) \wedge \\ & ((v1\_partfun1 X1 X0) \wedge (v1\_index\_1 X1)))))) \wedge (((v1\_relat\_1 X2) \wedge \\ & ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_partfun1 X2 X0) \wedge (v1\_index\_1 \\ & X2)))))) \wedge ((m2\_index\_1 X3 X0 X1 X2) \wedge (m1\_subset\_1 X4 X0)))) \Rightarrow (k7\_index\_1 \\ & X0 X1 X2 X3 X4 = k1\_funct\_1 X3 X4) \quad (3) \end{aligned}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & (((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X0 X1)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X0 X1))))))\wedge(m1\_subset\_1 X3 X0)))\Rightarrow(k3\_funct\_2 X0 \\ & X1 X2 X3 = k1\_funct\_1 X2 X3) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge((v1\_relat\_1 \\ & X1)\wedge((v4\_relat\_1 X1 X0)\wedge((v1\_funct\_1 X1)\wedge((v1\_partfun1 X1 X0)\wedge \\ & (v1\_index\_1 X1))))))\wedge(m1\_subset\_1 X2 X0))\Rightarrow(k2\_index\_1 X0 X1 X2 = \\ & k1\_funct\_1 X1 X2) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1\_relat\_1 X1)\wedge(v4\_relat\_1 X1 X0))\Rightarrow( \\ & k1\_relset\_1 X0 X1 = k9\_xtuple\_0 X1) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((v1\_relat\_1 X0)\wedge(v1\_funct\_1 X0))\wedge(( \\ & v1\_relat\_1 X1)\wedge((v1\_funct\_1 X1)\wedge(v1\_index\_1 X1))))\Rightarrow((v1\_relat\_1 \\ & (k3\_relat\_1 X0 X1))\wedge(v1\_index\_1 (k3\_relat\_1 X0 X1))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X1)\wedge \\ & (((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X0 X1)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X0 X1))))))\wedge((v1\_relat\_1 X3)\wedge((v4\_relat\_1 X3 X1)\wedge \\ & ((v1\_funct\_1 X3)\wedge(v1\_partfun1 X3 X1))))))\Rightarrow((v1\_relat\_1 (k3\_relat\_1 \\ & X2 X3))\wedge((v4\_relat\_1 (k3\_relat\_1 X2 X3) X0)\wedge((v1\_funct\_1 (k3\_relat\_1 \\ & X2 X3))\wedge(v1\_partfun1 (k3\_relat\_1 X2 X3) X0)))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.((v2\_index\_1 X2 X0 X1)\wedge(m1\_index\_1 \\ & X2 X0 X1))\Rightarrow(v1\_index\_1 (k1\_xtuple\_0 X2)) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(m1\_index\_1 X2 X0 X1)\Rightarrow((v1\_relat\_1 \\ & (k1\_xtuple\_0 X2))\wedge((v4\_relat\_1 (k1\_xtuple\_0 X2) X0)\wedge((v1\_funct\_1 \\ & (k1\_xtuple\_0 X2))\wedge(v1\_partfun1 (k1\_xtuple\_0 X2) X0)))) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & ((\neg v1\_xboole\_0 X1)\wedge((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X1 X0)\wedge \\ & (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0))))))\wedge((v1\_funct\_1 \\ & X3)\wedge((v1\_funct\_2 X3 X1 X0)\wedge(m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 X0))))))\Rightarrow(\forall X4.(m3\_index\_1 X4 X0 X1 X2 X3)\Rightarrow((v2\_index\_1 \\ & X4 X0 X1)\wedge(m1\_index\_1 X4 X0 X1))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1\_xboole\_0 \\ & X0)\wedge(((v1\_relat\_1 X1)\wedge((v4\_relat\_1 X1 X0)\wedge((v1\_funct\_1 X1)\wedge \\ & ((v1\_partfun1 X1 X0)\wedge(v1\_index\_1 X1))))))\wedge(((v1\_relat\_1 X2)\wedge \\ & ((v4\_relat\_1 X2 X0)\wedge((v1\_funct\_1 X2)\wedge((v1\_partfun1 X2 X0)\wedge(v1\_index\_1 \\ & X2))))))\wedge((m2\_index\_1 X3 X0 X1 X2)\wedge(m1\_subset\_1 X4 X0))))\Rightarrow(m2\_cat\_1 \\ & (k7\_index\_1 X0 X1 X2 X3 X4) (k2\_index\_1 X0 X1 X4) (k2\_index\_1 X0 X2 \\ & X4)) \end{aligned} \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.v1\_relat\_1 (k3\_relat\_1 X0 X1) \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0 X0)\wedge \\ & (((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X0 X1)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 X0 X1))))))\wedge(m1\_subset\_1 X3 X0))\Rightarrow(m1\_subset\_1 ( \\ & k3\_funct\_2 X0 X1 X2 X3) X1) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0.(\neg v1\_xboole\_0 X0)\Rightarrow(\forall X1.(\neg v1\_xboole\_0 X1)\Rightarrow \\ & (\forall X2.((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 X1 X0)\wedge(m1\_subset\_1 \\ & X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0))))))\Rightarrow(\forall X3.((v1\_funct\_1 \\ & X3)\wedge((v1\_funct\_2 X3 X1 X0)\wedge(m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 X0))))))\Rightarrow(\forall X4.((v2\_index\_1 X4 X0 X1)\wedge(m1\_index\_1 X4 X0 \\ & X1))\Rightarrow((m3\_index\_1 X4 X0 X1 X2 X3)\Leftrightarrow(m2\_index\_1 (k2\_xtuple\_0 X4) \\ & X1 (k3\_relat\_1 X2 (k1\_xtuple\_0 X4)) (k3\_relat\_1 X3 (k1\_xtuple\_0 \\ & X4)))))) \end{aligned} \quad (15)$$

Assume the following.

$$\forall X0.\forall X1.((v1\_relat\_1 X1)\wedge(v4\_relat\_1 X1 X0))\Rightarrow( \\ (v1\_partfun1 X1 X0)\Leftrightarrow(k1\_relset\_1 X0 X1 = X0)) \quad (16)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ (k2\_zfmisc\_1 X0 X1)))\Rightarrow(v1\_relat\_1 X2) \quad (17)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.(\neg v1\_xboole\_0 X0) \Rightarrow (\forall X1.(\neg v1\_xboole\_0 X1) \Rightarrow \\ & (\forall X2.((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 X1 X0) \wedge (m1\_subset\_1 \\ & X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0)))))) \Rightarrow (\forall X3.((v1\_funct\_1 \\ & X3) \wedge ((v1\_funct\_2 X3 X1 X0) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 X0)))))) \Rightarrow (\forall X4.(m3\_index\_1 X4 X0 X1 X2 X3) \Rightarrow (\forall X5. \\ & (m1\_subset\_1 X5 X1) \Rightarrow (m2\_cat\_1 (k1\_funct\_1 (k2\_xtuple\_0 X4) X5) \\ & (k2\_index\_1 X0 (k1\_xtuple\_0 X4) (k3\_funct\_2 X1 X0 X2 X5)) (k2\_index\_1 \\ & X0 (k1\_xtuple\_0 X4) (k3\_funct\_2 X1 X0 X3 X5)))))) \end{aligned}$$