

t16_msualg_3
(TMSkLTPFU4eBr7ZSjB9XQZwVfxUqkY2haSf)

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Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $v11_struct_0 : \iota \Rightarrow o$ be given. Let $l1_msualg_1 : \iota \Rightarrow o$ be given. Let $l3_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r4_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $u3_msualg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r5_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r1_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k6_partfun1 : \iota \Rightarrow \iota$ be given. Let $k4_relat_1 : \iota \Rightarrow \iota$ be given. Let $v1_relat_1 : \iota \Rightarrow o$ be given. Let $v4_relat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_relset_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k9_xtuple_0 : \iota \Rightarrow \iota$ be given. Let $k10_xtuple_0 : \iota \Rightarrow \iota$ be given. Let $v2_funct_1 : \iota \Rightarrow o$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $l2_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v1_partfun1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m2_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l5_struct_0 : \iota \Rightarrow o$ be given. Let $r3_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v1_msualg_3 : \iota \Rightarrow o$ be given. Let $r2_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v2_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_funct_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge (l1_msualg_1 \\ X0))) \Rightarrow (\forall X1.(l3_msualg_1 X1 X0) \Rightarrow (r1_msualg_3 X0 X1 X1 (k2_msualg_3 \\ (u1_struct_0 X0) (u3_msualg_1 X0 X1)))) \end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.k6_partfun1 X0 = k4_relat_1 X0 \tag{2}$$

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1) \wedge (v4_relat_1 X1 X0)) \Rightarrow (\\ k1_relset_1 X0 X1 = k9_xtuple_0 X1) \tag{3}$$

Assume the following.

$$\forall X0.k10_xtuple_0 (k4_relat_1 X0) = X0 \tag{4}$$

Assume the following.

$$\forall X0.(v1_relat_1 (k4_relat_1 X0)) \wedge (v2_funct_1 (k4_relat_1 X0)) \tag{5}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((l1_struct_0 X0) \wedge (l2_msualg_1 X1 X0)) \Rightarrow \\ & ((v1_relat_1 (u3_msualg_1 X0 X1)) \wedge ((v4_relat_1 (u3_msualg_1 \\ & X0 X1) (u1_struct_0 X0)) \wedge ((v1_funct_1 (u3_msualg_1 X0 X1)) \wedge (v1_partfun1 \\ & (u3_msualg_1 X0 X1) (u1_struct_0 X0)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((v1_relat_1 X1) \wedge ((v4_relat_1 \\ & X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \wedge ((v1_relat_1 \\ & X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))))) \Rightarrow \\ & (\forall X3. (m2_pboole X3 X0 X1 X2) \Rightarrow ((v1_relat_1 X3) \wedge ((v4_relat_1 \\ & X3 X0) \wedge ((v1_funct_1 X3) \wedge (v1_partfun1 X3 X0)))))) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0. (l5_struct_0 X0) \Rightarrow (l1_struct_0 X0) \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge (l1_msualg_1 X0)) \Rightarrow (\forall X1. \\ & (l3_msualg_1 X1 X0) \Rightarrow (l2_msualg_1 X1 X0)) \end{aligned} \quad (9)$$

Assume the following.

$$\forall X0. (l1_msualg_1 X0) \Rightarrow (l5_struct_0 X0) \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (m2_pboole (k2_msualg_3 \\ & X0 X1) X0 X1 X1) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge (l1_msualg_1 \\ & X0))) \Rightarrow (\forall X1. (l3_msualg_1 X1 X0) \Rightarrow (\forall X2. (l3_msualg_1 \\ & X2 X0) \Rightarrow (\forall X3. (m2_pboole X3 (u1_struct_0 X0) (u3_msualg_1 \\ & X0 X1) (u3_msualg_1 X0 X2)) \Rightarrow ((r3_msualg_3 X0 X1 X2 X3) \Leftrightarrow ((r1_msualg_3 \\ & X0 X1 X2 X3) \wedge (v1_msualg_3 X3)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge (l1_msualg_1 \\ & X0))) \Rightarrow (\forall X1. (l3_msualg_1 X1 X0) \Rightarrow (\forall X2. (l3_msualg_1 \\ & X2 X0) \Rightarrow (\forall X3. (m2_pboole X3 (u1_struct_0 X0) (u3_msualg_1 \\ & X0 X1) (u3_msualg_1 X0 X2)) \Rightarrow ((r2_msualg_3 X0 X1 X2 X3) \Leftrightarrow ((r1_msualg_3 \\ & X0 X1 X2 X3) \wedge (v2_msualg_3 X3 (u1_struct_0 X0) (u3_msualg_1 X0 X1) \\ & (u3_msualg_1 X0 X2)))))) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.((v1_relat_1 \\ X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))\Rightarrow \\ (\forall X3.(m2_pboole X3 X0 X1 X2)\Rightarrow((v2_msualg_3 X3 X0 X1 X2)\Leftrightarrow(\\ \forall X4.(X4 \in X0)\Rightarrow(k10_xtuple_0 (k1_funct_1 X3 X4) = k1_funct_1 \\ X2 X4)))))) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((v1_relat_1 X1)\wedge(v4_relat_1 X1 X0))\Rightarrow(\\ (v1_partfun1 X1 X0)\Leftrightarrow(k1_relset_1 X0 X1 = X0)) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} \forall X0.((v1_relat_1 X0)\wedge(v1_funct_1 X0))\Rightarrow((v1_msualg_3 \\ X0)\Leftrightarrow(\forall X1.\forall X2.((v1_relat_1 X2)\wedge(v1_funct_1 X2))\Rightarrow \\ (((X1 \in k9_xtuple_0 X0)\wedge(k1_funct_1 X0 X1 = X2))\Rightarrow(v2_funct_1 X2)))) \end{aligned} \quad (16)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(\\ (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow(\forall X2.(m2_pboole \\ X2 X0 X1 X1)\Rightarrow((X2 = k2_msualg_3 X0 X1)\Leftrightarrow(\forall X3.(X3 \in X0)\Rightarrow(k1_funct_1 \\ X2 X3 = k6_partfun1 (k1_funct_1 X1 X3)))))) \end{aligned} \quad (17)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge(l1_msualg_1 \\ X0)))\Rightarrow(\forall X1.(l3_msualg_1 X1 X0)\Rightarrow(\forall X2.(l3_msualg_1 \\ X2 X0)\Rightarrow((r5_msualg_3 X0 X1 X2)\Leftrightarrow(\exists X3.(m2_pboole X3 (u1_struct_0 \\ X0) (u3_msualg_1 X0 X1) (u3_msualg_1 X0 X2))\wedge(r4_msualg_3 X0 X1 \\ X2 X3)))))) \end{aligned} \quad (18)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge(l1_msualg_1 \\ X0)))\Rightarrow(\forall X1.(l3_msualg_1 X1 X0)\Rightarrow(\forall X2.(l3_msualg_1 \\ X2 X0)\Rightarrow(\forall X3.(m2_pboole X3 (u1_struct_0 X0) (u3_msualg_1 \\ X0 X1) (u3_msualg_1 X0 X2))\Rightarrow((r4_msualg_3 X0 X1 X2 X3)\Leftrightarrow((r2_msualg_3 \\ X0 X1 X2 X3)\wedge(r3_msualg_3 X0 X1 X2 X3)))))) \end{aligned} \quad (19)$$

Theorem 1

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge(l1_msualg_1 \\ X0)))\Rightarrow(\forall X1.(l3_msualg_1 X1 X0)\Rightarrow((r4_msualg_3 X0 X1 X1 (\\ k2_msualg_3 (u1_struct_0 X0) (u3_msualg_1 X0 X1)))\wedge(r5_msualg_3 \\ X0 X1 X1))) \end{aligned}$$