

t13\_msualg\_9  
(TMLteiubf9cqkLSS9vYkqgFbNirXGoaoWPd)

October 27, 2020

Let  $v2\_struct.0 : \iota \Rightarrow o$  be given. Let  $l1\_msualg.1 : \iota \Rightarrow o$  be given. Let  $v4\_msualg.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l3\_msualg.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_card.3 : \iota \Rightarrow \iota$  be given. Let  $u3\_msualg.1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct.1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k12\_card.3 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct.0 : \iota \Rightarrow \iota$  be given. Let  $v1\_relat.1 : \iota \Rightarrow o$  be given. Let  $v1\_funct.1 : \iota \Rightarrow o$  be given. Let  $k9\_xtuple.0 : \iota \Rightarrow \iota$  be given. Let  $v1\_xboole.0 : \iota \Rightarrow o$  be given. Let  $v4\_relat.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_relat.1 : \iota \Rightarrow o$  be given. Let  $v4\_funct.1 : \iota \Rightarrow o$  be given. Let  $l1\_struct.0 : \iota \Rightarrow o$  be given. Let  $l2\_msualg.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l5\_struct.0 : \iota \Rightarrow o$  be given. Let  $v5\_funct.1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} \forall X0.((v1\_relat.1 X0) \wedge (v1\_funct.1 X0)) \Rightarrow (\forall X1.(( \\ v1\_relat.1 X1) \wedge (v1\_funct.1 X1)) \Rightarrow ((X0 \in k4\_card.3 X1) \Leftrightarrow ((k9\_xtuple.0 \\ X0 = k9\_xtuple.0 X1) \wedge (\forall X2.(X2 \in k9\_xtuple.0 X1) \Rightarrow (k1\_funct.1 \\ X0 X2 \in k1\_funct.1 X1 X2)))))) \end{aligned} \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. (m1\_subset.1 X0 X1) \Rightarrow ((v1\_xboole.0 X1) \vee (X0 \in X1)) \quad (2)$$

Assume the following.

$$\begin{aligned} \forall X0.((v1\_relat.1 X0) \wedge (v1\_funct.1 X0)) \Rightarrow (\forall X1.(( \\ v1\_relat.1 X1) \wedge (v1\_funct.1 X1)) \Rightarrow (((k9\_xtuple.0 X0 = k9\_xtuple.0 \\ X1) \wedge (\forall X2.(X2 \in k9\_xtuple.0 X0) \Rightarrow (k1\_funct.1 X0 X2 = k1\_funct.1 \\ X1 X2))) \Rightarrow (X0 = X1))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. ((\neg v1\_xboole.0 X0) \wedge (((v1\_relat.1 \\ X1) \wedge ((v4\_relat.1 X1 X0) \wedge ((v1\_funct.1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge \\ ((v1\_relat.1 X2) \wedge ((v4\_relat.1 X2 X0) \wedge ((v1\_funct.1 X2) \wedge (v1\_partfun1 \\ X2 X0)))))) \Rightarrow ((r8\_pboole X0 X1 X2) \Leftrightarrow (X1 = X2)) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0.((v1\_relat\_1 X0)\wedge((v2\_relat\_1 X0)\wedge(v1\_funct\_1 X0)))\Rightarrow (\neg v1\_xboole\_0 (k4\_card\_3 X0)) \quad (5)$$

Assume the following.

$$\forall X0.((v1\_relat\_1 X0)\wedge(v1\_funct\_1 X0))\Rightarrow(v4\_funct\_1 (k4\_card\_3 X0)) \quad (6)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge(l1\_struct\_0 X0))\Rightarrow(\neg v1\_xboole\_0 (u1\_struct\_0 X0)) \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.((l1\_struct\_0 X0)\wedge((v4\_msualg\_1 X1 X0)\wedge(l2\_msualg\_1 X1 X0)))\Rightarrow((v1\_relat\_1 (u3\_msualg\_1 X0 X1))\wedge((v2\_relat\_1 (u3\_msualg\_1 X0 X1))\wedge((v4\_relat\_1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0))\wedge((v1\_funct\_1 (u3\_msualg\_1 X0 X1))\wedge(v1\_partfun1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0))))))) \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.((l1\_struct\_0 X0)\wedge(l2\_msualg\_1 X1 X0))\Rightarrow ((v1\_relat\_1 (u3\_msualg\_1 X0 X1))\wedge((v4\_relat\_1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0))\wedge((v1\_funct\_1 (u3\_msualg\_1 X0 X1))\wedge(v1\_partfun1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0)))))) \quad (9)$$

Assume the following.

$$\forall X0.(l5\_struct\_0 X0)\Rightarrow(l1\_struct\_0 X0) \quad (10)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge(l1\_msualg\_1 X0))\Rightarrow(\forall X1.(l3\_msualg\_1 X1 X0)\Rightarrow(l2\_msualg\_1 X1 X0)) \quad (11)$$

Assume the following.

$$\forall X0.(l1\_msualg\_1 X0)\Rightarrow(l5\_struct\_0 X0) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.((v1\_relat\_1 X0)\wedge(v1\_funct\_1 X0))\Rightarrow((v1\_relat\_1 (k12\_card\_3 X0 X1))\wedge(v1\_funct\_1 (k12\_card\_3 X0 X1))) \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge (v1\_funct\_1 X0)) \Rightarrow (\forall X1. \forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((X2 = k12\_card\_3 X0 X1) \Leftrightarrow (( \\ & k9\_xtuple\_0 X2 = k4\_card\_3 X0) \wedge (\forall X3. ((v1\_relat\_1 X3) \wedge ( \\ & v1\_funct\_1 X3)) \Rightarrow ((X3 \in k9\_xtuple\_0 X2) \Rightarrow (k1\_funct\_1 X2 X3 = k1\_funct\_1 \\ & X3 X1)))))) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v2\_relat\_1 X0) \wedge (v1\_funct\_1 X0))) \Rightarrow \\ & (\forall X1.(m1\_subset\_1 X1 (k4\_card\_3 X0)) \Rightarrow (v5\_funct\_1 X1 X0)) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned} & \forall X0.(v4\_funct\_1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 X0) \Rightarrow ( \\ & (v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1))) \end{aligned} \quad (16)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v2\_relat\_1 X1) \wedge ((v4\_relat\_1 \\ & X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))))) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (k4\_card\_3 X1)) \Rightarrow (v1\_partfun1 X2 X0)) \end{aligned} \quad (17)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge ( \\ & v1\_funct\_1 X1))) \Rightarrow (\forall X2. ((v1\_relat\_1 X2) \wedge ((v1\_funct\_1 \\ & X2) \wedge (v5\_funct\_1 X2 X1))) \Rightarrow ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge \\ & (v1\_funct\_1 X2)))) \end{aligned} \quad (18)$$

### Theorem 1

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge (l1\_msualg\_1 X0)) \Rightarrow (\forall X1. \\ & ((v4\_msualg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 \\ & X2 (k4\_card\_3 (u3\_msualg\_1 X0 X1))) \Rightarrow (\forall X3.(m1\_subset\_1 \\ & X3 (k4\_card\_3 (u3\_msualg\_1 X0 X1))) \Rightarrow ((\forall X4.k1\_funct\_1 ( \\ & k12\_card\_3 (u3\_msualg\_1 X0 X1) X4) X2 = k1\_funct\_1 (k12\_card\_3 ( \\ & u3\_msualg\_1 X0 X1) X4) X3) \Rightarrow (r8\_pboole (u1\_struct\_0 X0) X2 X3)))))) \end{aligned}$$