

t14_msafree (TMNvwgDfoqn- STJth9fMJE6EykdHD9FFyVHN)

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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 $v1_relat_1 : \iota \Rightarrow o$ be given. Let $v2_relat_1 : \iota \Rightarrow o$ be given. Let $v4_relat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v1_partfun1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k13_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $k12_msafree : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $l2_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u3_msualg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m3_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l3_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m1_msafree : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l5_struct_0 : \iota \Rightarrow o$ be given. Let $k11_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_funct_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0. \forall X1. (X0 \in X1) \Rightarrow (m1_subset_1 X0 X1) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 \\ & X0) \wedge (l1_msualg_1 X0))) \wedge (((v1_relat_1 X1) \wedge (v2_relat_1 X1) \wedge \\ & ((v4_relat_1 X1 (u1_struct_0 X0)) \wedge (v1_funct_1 X1) \wedge (v1_partfun1 \\ & X1 (u1_struct_0 X0)))))) \wedge (m1_subset_1 X2 (u1_struct_0 X0))) \Rightarrow \\ & (\neg v1_xboole_0 (k12_msafree X0 X1 X2)) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((l1_struct_0 X0) \wedge (l2_msualg_1 X1 X0)) \Rightarrow \\ & ((v1_relat_1 (u3_msualg_1 X0 X1)) \wedge ((v4_relat_1 (u3_msualg_1 \\ & X0 X1) (u1_struct_0 X0)) \wedge (v1_funct_1 (u3_msualg_1 X0 X1)) \wedge (v1_partfun1 \\ & (u3_msualg_1 X0 X1) (u1_struct_0 X0)))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. (m3_pboole \\ & X2 X0 X1) \Rightarrow ((v1_relat_1 X2) \wedge ((v4_relat_1 X2 X0) \wedge (v1_funct_1 X2) \wedge \\ & (v1_partfun1 X2 X0)))) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(l1_msualg_1 X0)))\wedge(l3_msualg_1 X1 X0)\Rightarrow(\forall X2.(m1_msafree X2 X0 X1)\Rightarrow(m3_pboole X2 (u1_struct_0 X0) (u3_msualg_1 X0 X1))) \quad (5)$$

Assume the following.

$$\forall X0.(l5_struct_0 X0)\Rightarrow(l1_struct_0 X0) \quad (6)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(l1_msualg_1 X0))\Rightarrow(\forall X1.(l3_msualg_1 X1 X0)\Rightarrow(l2_msualg_1 X1 X0)) \quad (7)$$

Assume the following.

$$\forall X0.(l1_msualg_1 X0)\Rightarrow(l5_struct_0 X0) \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(l1_msualg_1 X0)))\wedge((v1_relat_1 X1)\wedge(v2_relat_1 X1)\wedge(v4_relat_1 X1 (u1_struct_0 X0))\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 (u1_struct_0 X0))))\Rightarrow(m1_msafree (k13_msafree X0 X1) X0 (k11_msafree X0 X1)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(l1_msualg_1 X0)))\wedge((v1_relat_1 X1)\wedge(v2_relat_1 X1)\wedge(v4_relat_1 X1 (u1_struct_0 X0))\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 (u1_struct_0 X0))))\Rightarrow(l3_msualg_1 (k11_msafree X0 X1) X0) \quad (10)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(\neg v11_struct_0 X0)\wedge(l1_msualg_1 X0))\Rightarrow(\forall X1.((v1_relat_1 X1)\wedge(v2_relat_1 X1)\wedge(v4_relat_1 X1 (u1_struct_0 X0))\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 (u1_struct_0 X0))))\Rightarrow(\forall X2.(m1_msafree X2 X0 (k11_msafree X0 X1))\Rightarrow(X2 = k13_msafree X0 X1)\Leftrightarrow(\forall X3.(m1_subset_1 X3 (u1_struct_0 X0)\Rightarrow(k1_funct_1 X2 X3 = k12_msafree X0 X1 X3)))) \quad (11)$$

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge(v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))\Rightarrow((v2_relat_1 X1)\Leftrightarrow(\forall X2.\neg(X2 \in X0)\wedge(v1_xboole_0 (k1_funct_1 X1 X2)))) \quad (12)$$

Theorem 1

$$\begin{aligned} & \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge (l1_msualg_1 \\ & X0))) \Rightarrow (\forall X1.((v1_relat_1 X1) \wedge ((v2_relat_1 X1) \wedge ((v4_relat_1 \\ & X1 (u1_struct_0 X0)) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 (u1_struct_0 \\ & X0)))))) \Rightarrow (v2_relat_1 (k13_msafree X0 X1))) \end{aligned}$$