

t13_autalg_1
(TMTWN7imPPdUXsc5LgAPa9TDJPBt42aNX7z)

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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 $v1_funct_1 : \iota \Rightarrow o$ 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 $v1_msualg_3 : \iota \Rightarrow o$ be given. Let $v2_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r6_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k4_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v2_funct_1 : \iota \Rightarrow o$ be given. Let $k2_funct_1 : \iota \Rightarrow \iota$ be given. Let $v1_funcop_1 : \iota \Rightarrow o$ be given. Let $k1_funct_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.((v1_relat_1 X0) \wedge (v1_funct_1 X0)) \Rightarrow ((v2_funct_1 X0) \Rightarrow (k2_funct_1 (k2_funct_1 X0) = X0)) \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge (v1_funct_1 X1) \wedge ((v1_partfun1 X1 X0) \wedge (v1_funcop_1 X1)))) \Rightarrow ((v1_msualg_3 X1) \Leftrightarrow (\forall X2. (X2 \in X0) \Rightarrow (v2_funct_1 (k1_funct_1 X1 X2)))) \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v2_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))))) \Rightarrow (\forall X2. ((v1_relat_1 X2) \wedge ((v2_relat_1 X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))))) \Rightarrow (\forall X3. (m2_pboole X3 X0 X1 X2) \Rightarrow (((v1_msualg_3 X3) \wedge (v2_msualg_3 X3 X0 X1 X2)) \Rightarrow ((v1_msualg_3 (k4_msualg_3 X0 X1 X2 X3)) \wedge (v2_msualg_3 (k4_msualg_3 X0 X1 X2 X3) X0 X2 X1)))))) \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. (((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \wedge ((v1_relat_1 X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))))) \Rightarrow ((r6_pboole X0 X1 X2) \Leftrightarrow (X1 = X2)) \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X0)\wedge((v1_funct_1 X0)\wedge(v1_funcop_1 X0)))\Rightarrow((v1_relat_1 (k1_funct_1 X0 X1))\wedge(v1_funct_1 (k1_funct_1 X0 X1))) \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))))\Rightarrow \\ & (\forall X3.(m2_pboole X3 X0 X1 X2)\Rightarrow((v1_relat_1 X3)\wedge((v4_relat_1 X3 X0)\wedge((v1_funct_1 X3)\wedge(v1_partfun1 X3 X0)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge \\ & (((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))\wedge(m2_pboole X3 X0 X1 X2)))\Rightarrow(m2_pboole (k4_msualg_3 X0 X1 X2 X3) X0 X2 X1) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow(\forall X2.((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))\Rightarrow \\ & (\forall X3.(m2_pboole X3 X0 X1 X2)\Rightarrow(((v1_msualg_3 X3)\wedge(v2_msualg_3 X3 X0 X1 X2))\Rightarrow(\forall X4.(m2_pboole X4 X0 X2 X1)\Rightarrow((X4 = k4_msualg_3 X0 X1 X2 X3)\Leftrightarrow(\forall X5.(X5 \in X0)\Rightarrow(k1_funct_1 X4 X5 = k2_funct_1 (k1_funct_1 X3 X5)))))))))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))))\Rightarrow \\ & (\forall X3.(m2_pboole X3 X0 X1 X2)\Rightarrow(v1_funcop_1 X3)) \end{aligned} \quad (9)$$

Theorem 1

$$\begin{aligned} & \forall X0.\forall X1.(((v1_relat_1 X1)\wedge((v2_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))))\Rightarrow(\forall X2. \\ & (((v1_relat_1 X2)\wedge((v2_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))))\Rightarrow(\forall X3.(m2_pboole X3 X0 X1 X2)\Rightarrow \\ & (((v1_msualg_3 X3)\wedge(v2_msualg_3 X3 X0 X1 X2))\Rightarrow(r6_pboole X0 (k4_msualg_3 X0 X2 X1 (k4_msualg_3 X0 X1 X2 X3) X3)))))) \end{aligned}$$