

t14_closure1
(TMLemvCaZDU31ue79kgi6vraqCEHw7Km1eP)

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Let $v1_relat_1 : \iota \Rightarrow o$ 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 $v3_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_msualg_3 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m2_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v2_relat_1 : \iota \Rightarrow o$ be given. Let $m1_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r6_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_mboolean : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k2_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k15_pralg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v2_relat_1 X1) \wedge ((v4_relat_1 \\ & X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))))) \Rightarrow (\forall X2. \\ (m1_pboole X2 X0 X1) \Rightarrow (r6_pboole X0 X2 (k1_closure1 X0 X1 X1 (k2_msualg_3 \\ X0 X1) X2))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (k5_mssubfam X0 X1 = k1_mboolean \\ X0 X1) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((v1_relat_1 X1) \wedge \\ ((v4_relat_1 X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \wedge \\ ((m2_pboole X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1)) \wedge (m1_pboole \\ X3 X0 (k5_mssubfam X0 X1)))) \Rightarrow (k2_closure1 X0 X1 X2 X3 = k15_pralg_1 \\ X2 X3) \end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((v1_relat_1 \\ & X1)\wedge((v2_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge \\ & v1_partfun1 X1 X0))))\wedge(((v1_relat_1 X2)\wedge((v2_relat_1 X2)\wedge \\ & (v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))\wedge \\ & ((m2_pboole X3 X0 X1 X2)\wedge(m1_pboole X4 X0 X1)))\Rightarrow(k1_closure1 X0 \\ & X1 X2 X3 X4 = k15_pralg_1 X3 X4) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow((v1_relat_1 (k1_mboolean \\ & X0 X1))\wedge((v2_relat_1 (k1_mboolean X0 X1))\wedge((v4_relat_1 (k1_mboolean \\ & X0 X1) X0)\wedge((v1_funct_1 (k1_mboolean X0 X1))\wedge(v1_partfun1 (k1_mboolean \\ & X0 X1) X0)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(m2_pboole (k2_msualg_3 \\ & X0 X1) X0 X1 X1) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((v1_relat_1 X1)\wedge \\ & ((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge \\ & ((m2_pboole X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\wedge(m1_pboole \\ & X3 X0 (k5_mssubfam X0 X1)))\Rightarrow(m1_pboole (k2_closure1 X0 X1 X2 X3) \\ & X0 (k5_mssubfam X0 X1)) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow((v1_relat_1 (k1_mboolean \\ & X0 X1))\wedge((v4_relat_1 (k1_mboolean X0 X1) X0)\wedge((v1_funct_1 (k1_mboolean \\ & X0 X1))\wedge(v1_partfun1 (k1_mboolean X0 X1) X0)))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m2_pboole \\ & X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\Rightarrow((v3_closure1 X2 \\ & X0 X1)\Leftrightarrow(\forall X3.(m1_pboole X3 X0 (k5_mssubfam X0 X1))\Rightarrow(r6_pboole \\ & X0 (k2_closure1 X0 X1 X2 X3) (k2_closure1 X0 X1 X2 (k2_closure1 X0 \\ & X1 X2 X3)))))) \end{aligned} \quad (9)$$

Theorem 1

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow((v3_closure1 (k2_msualg_3 X0 (k5_mssubfam X0 X1)) X0 X1)\wedge(m2_pboole (k2_msualg_3 X0 (k5_mssubfam X0 X1)) X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1)))$$