

t16_closure1

(TMd94BrCBAkSScCwscNjZYENVzQxYGnxBBV)

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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 $m2_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k5_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota$ 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 $v1_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1_mboolean : \iota \Rightarrow \iota$ be given. Let $r1_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r2_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v2_relat_1 : \iota \Rightarrow o$ be given. Let $k15_pralg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned}
 & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\
 & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1_relat_1 \\
 & X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))) \Rightarrow \\
 & ((r6_pboole X0 X1 (k1_mboolean X0 X2)) \Leftrightarrow (\forall X3. ((v1_relat_1 \\
 & X3) \wedge ((v4_relat_1 X3 X0) \wedge ((v1_funct_1 X3) \wedge (v1_partfun1 X3 X0)))) \Rightarrow \\
 & ((r1_pboole X0 X3 X1) \Leftrightarrow (r2_pboole X0 X3 X2))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
 & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\
 & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1_relat_1 \\
 & X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))) \Rightarrow \\
 & (((r2_pboole X0 X1 X2) \wedge (r2_pboole X0 X2 X1)) \Rightarrow (r6_pboole X0 X1 X2)))
 \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
 & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\
 & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1_relat_1 \\
 & X2) \wedge ((v2_relat_1 X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge \\
 & v1_partfun1 X2 X0)))) \Rightarrow ((m1_pboole X1 X0 X2) \Rightarrow (r1_pboole X0 X1 X2)))
 \end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1_relat_1 X1)\wedge((v4_relat_1 \\ & X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge((v1_relat_1 \\ & X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))\Rightarrow \\ & ((r6_pboole X0 X1 X2)\Leftrightarrow(X1 = X2)) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(\\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow(k5_mssubfam X0 X1 = k1_mboolean \\ & X0 X1) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((v1_relat_1 X1)\wedge \\ & ((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge \\ & ((m2_pboole X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\wedge(m1_pboole \\ & X3 X0 (k5_mssubfam X0 X1))))\Rightarrow(k2_closure1 X0 X1 X2 X3 = k15_pralg_1 \\ & X2 X3) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(\\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow((v1_relat_1 (k1_mboolean \\ & X0 X1))\wedge((v2_relat_1 (k1_mboolean X0 X1))\wedge((v4_relat_1 (k1_mboolean \\ & X0 X1) X0)\wedge((v1_funct_1 (k1_mboolean X0 X1))\wedge(v1_partfun1 (k1_mboolean \\ & X0 X1) X0)))))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(\\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\Rightarrow(\forall X2.(m1_pboole \\ & X2 X0 X1)\Rightarrow((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge \\ & (v1_partfun1 X2 X0)))))) \end{aligned} \quad (8)$$

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\
& \quad (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. (m2_pboole \\
& X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1)) \Rightarrow ((v1_closure1 X2 \\
& X0 X1) \Leftrightarrow (\forall X3. (m1_pboole X3 X0 (k5_mssubfam X0 X1)) \Rightarrow (r2_pboole \\
& X0 X3 (k2_closure1 X0 X1 X2 X3))))))
\end{aligned} \tag{10}$$

Theorem 1

$$\begin{aligned}
& \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\
& \quad (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. (m2_pboole \\
& X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1)) \Rightarrow (\forall X3. (m1_pboole \\
& X3 X0 (k5_mssubfam X0 X1)) \Rightarrow (((r6_pboole X0 X3 X1) \wedge (v1_closure1 \\
& X2 X0 X1)) \Rightarrow (r6_pboole X0 X3 (k2_closure1 X0 X1 X2 X3))))))
\end{aligned}$$