

t17_closure1
(TMKaLkyj8aNuyNHTcpomkDPpmSYMASNAkCH)

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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 $v1_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m1_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r2_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v3_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r6_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_mboolean : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

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

Assume the following.

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

Assume the following.

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

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((v1_relat_1 X1) \wedge \\ & ((v4_relat_1 X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \wedge \\ & ((m2_pboole X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1)) \wedge (m1_pboole \\ & X3 X0 (k5_mssubfam X0 X1)))) \Rightarrow (m1_pboole (k2_closure1 X0 X1 X2 X3) \\ & X0 (k5_mssubfam X0 X1)) \end{aligned} \quad (4)$$

Assume the following.

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

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m2_pboole \\ & X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\Rightarrow((v3_closure1 X2 \\ & X0 X1)\Leftrightarrow(\forall X3.(m1_pboole X3 X0 (k5_mssubfam X0 X1))\Rightarrow(r6_pboole \\ & X0 (k2_closure1 X0 X1 X2 X3) (k2_closure1 X0 X1 X2 (k2_closure1 X0 \\ & X1 X2 X3)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m2_pboole \\ & X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\Rightarrow((v1_closure1 X2 \\ & X0 X1)\Leftrightarrow(\forall X3.(m1_pboole X3 X0 (k5_mssubfam X0 X1))\Rightarrow(r2_pboole \\ & X0 X3 (k2_closure1 X0 X1 X2 X3)))))) \end{aligned} \quad (7)$$

Theorem 1

$$\begin{aligned} & \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ & (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m2_pboole \\ & X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\Rightarrow(((v1_closure1 X2 \\ & X0 X1)\wedge(\forall X3.(m1_pboole X3 X0 (k5_mssubfam X0 X1))\Rightarrow(r2_pboole \\ & X0 (k2_closure1 X0 X1 X2 X3) X3))\Rightarrow(v3_closure1 X2 X0 X1))) \end{aligned}$$