

t35_closure1

(TMWRoGqUtTX6Qqb54RkVr7fHyP4S7YpnSWd)

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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 $v4_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m3_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_mbooleen : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ 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 $r6_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_closure1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v2_relat_1 : \iota \Rightarrow o$ 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 $k4_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v5_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v5_mssubfam \\ & X2 X0 X1) \wedge (m3_pboole X2 X0 (k1_mbooleen X0 X1))) \Rightarrow (\forall X3. (m1_pboole \\ & X3 X0 (k5_mssubfam X0 X1)) \Rightarrow (\exists X4. ((v2_relat_1 X4) \wedge (m3_pboole \\ & X4 X0 (k1_mbooleen X0 X1))) \wedge (\forall X5. ((v1_relat_1 X5) \wedge ((v4_relat_1 \\ & X5 X0) \wedge ((v1_funct_1 X5) \wedge (v1_partfun1 X5 X0)))) \Rightarrow ((r1_pboole X0 \\ & X5 X4) \Leftrightarrow ((r1_pboole X0 X5 X2) \wedge (r2_pboole X0 X3 X5)))))) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0 : \iota \Rightarrow o. \forall X1. \forall X2. \forall X3. (((v1_relat_1 \\ & X3) \wedge ((v2_relat_1 X3) \wedge ((v4_relat_1 X3 X2) \wedge ((v1_funct_1 X3) \wedge \\ & (v1_partfun1 X3 X2)))))) \wedge ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X2) \wedge \\ & ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X2)))) \Rightarrow ((\forall X4. ((v1_relat_1 \\ & X4) \wedge ((v4_relat_1 X4 X2) \wedge ((v1_funct_1 X4) \wedge (v1_partfun1 X4 X2)))) \Rightarrow \\ & ((r1_pboole X2 X4 X3) \Leftrightarrow ((r1_pboole X2 X4 X1) \wedge (X0 X4))) \Rightarrow (r2_pboole \\ & X2 X3 X1)) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((v1_relat_1 X1) \wedge ((v4_relat_1 \\ & X1 X0) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \wedge ((v1_relat_1 \\ & X2) \wedge ((v4_relat_1 X2 X0) \wedge ((v1_funct_1 X2) \wedge (v1_partfun1 X2 X0)))) \Rightarrow \\ & ((r6_pboole X0 X1 X2) \Leftrightarrow (X1 = X2)) \end{aligned} \quad (3)$$

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(k5_mssubfam X0 X1 = k1_mboolean X0 X1)$$
(4)

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m3_pboole X2 X0 X1)\Rightarrow((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))))$$
(5)

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m1_pboole X2 X0 X1)\Rightarrow((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge(v1_partfun1 X2 X0))))))$$
(6)

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge(m3_pboole X2 X0 (k1_mboolean X0 X1)))\Rightarrow(m3_pboole (k4_mssubfam X0 X1 X2) X0 X1)$$
(7)

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.(((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 X0))))\wedge((m2_pboole X2 X0 (k5_mssubfam X0 X1) (k5_mssubfam X0 X1))\wedge(m1_pboole X3 X0 (k5_mssubfam X0 X1))))\Rightarrow(m1_pboole (k2_closure1 X0 X1 X2 X3) X0 (k5_mssubfam X0 X1)))$$
(8)

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow((v1_relat_1 (k1_mboolean X0 X1))\wedge((v4_relat_1 (k1_mboolean X0 X1) X0)\wedge((v1_funct_1 (k1_mboolean X0 X1))\wedge(v1_partfun1 (k1_mboolean X0 X1) X0))))))$$
(9)

Assume the following.

$$\forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge(v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m3_pboole X2 X0 (k1_mboolean X0 X1))\Rightarrow((v4_mssubfam X2 X0 X1)\Leftrightarrow(\forall X3.(m3_pboole X3 X0 (k1_mboolean X0 X1))\Rightarrow((r2_pboole X0 X3 X2)\Rightarrow(r1_pboole X0 (k4_mssubfam X0 X1 X3) X2))))))$$
(10)

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. (m3_pboole \\ & X2 X0 (k1_mboolean X0 X1)) \Rightarrow ((v4_mssubfam X2 X0 X1) \Rightarrow (v5_mssubfam \\ & X2 X0 X1))) \end{aligned} \tag{11}$$

Theorem 1

$$\begin{aligned} & \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge \\ & (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v4_mssubfam \\ & X2 X0 X1) \wedge (m3_pboole X2 X0 (k1_mboolean X0 X1))) \Rightarrow (\forall X3. (m1_pboole \\ & X3 X0 (k5_mssubfam X0 X1)) \Rightarrow (\forall X4. (m2_pboole X4 X0 (k5_mssubfam \\ & X0 X1) (k5_mssubfam X0 X1)) \Rightarrow ((r6_pboole X0 (k2_closure1 X0 X1 X4 \\ & X3) X3) \wedge (\forall X5. (m1_pboole X5 X0 (k5_mssubfam X0 X1)) \Rightarrow (\forall X6. \\ & ((v2_relat_1 X6) \wedge (m3_pboole X6 X0 (k1_mboolean X0 X1))) \Rightarrow (\forall X7. \\ & ((v1_relat_1 X7) \wedge (v4_relat_1 X7 X0) \wedge ((v1_funct_1 X7) \wedge (v1_partfun1 \\ & X7 X0)))) \Rightarrow ((r1_pboole X0 X7 X6) \Leftrightarrow ((r1_pboole X0 X7 X2) \wedge (r2_pboole \\ & X0 X5 X7)))) \Rightarrow (r6_pboole X0 (k2_closure1 X0 X1 X4 X5) (k4_mssubfam \\ & X0 X1 X6)))))) \Rightarrow (r1_pboole X0 X3 X2)))))) \end{aligned}$$