

## t48\_mssubfam

(TMYGXw7w5rvsqzqPa6zEGWokRDWe2XSHUBv)

October 27, 2020

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  $m3\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_mboole : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r6\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_pboole : \iota \Rightarrow \iota$  be given. Let  $k4\_mssubfam : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1\_relat\_1 \\ & X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 X0)))) \Rightarrow \\ & (\forall X3. ((v1\_relat\_1 X3) \wedge ((v4\_relat\_1 X3 X0) \wedge ((v1\_funct\_1 \\ & X3) \wedge (v1\_partfun1 X3 X0)))) \Rightarrow ((r2\_pboole X0 X1 X2) \wedge (r6\_pboole \\ & X0 (k3\_pboole X0 X2 X3) (k1\_pboole X0))) \Rightarrow (r6\_pboole X0 (k3\_pboole \\ & X0 X1 X3) (k1\_pboole X0)))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1\_relat\_1 \\ & X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 X0)))) \Rightarrow \\ & (\forall X3. (m3\_pboole X3 X0 (k1\_mboole X0 X1)) \Rightarrow ((r1\_pboole \\ & X0 X2 X3) \Rightarrow (r2\_pboole X0 (k4\_mssubfam X0 X1 X3) X2)))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0))) \Rightarrow (\forall X2. (m3\_pboole \\ & X2 X0 X1) \Rightarrow ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge \\ & (v1\_partfun1 X2 X0)))))) \end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1\_relat\_1 X1)\wedge((v4\_relat\_1 \\ & X1 X0)\wedge((v1\_funct\_1 X1)\wedge(v1\_partfun1 X1 X0))))\wedge(m3\_pboole X2 \\ & X0 (k1\_mboolean X0 X1)))\Rightarrow(m3\_pboole (k4\_mssubfam X0 X1 X2) X0 X1) \end{aligned} \quad (4)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.\forall X1.((v1\_relat\_1 X1)\wedge((v4\_relat\_1 X1 X0)\wedge( \\ & (v1\_funct\_1 X1)\wedge(v1\_partfun1 X1 X0))))\Rightarrow(\forall X2.((v1\_relat\_1 \\ & X2)\wedge((v4\_relat\_1 X2 X0)\wedge((v1\_funct\_1 X2)\wedge(v1\_partfun1 X2 X0))))\Rightarrow \\ & (\forall X3.((v1\_relat\_1 X3)\wedge((v4\_relat\_1 X3 X0)\wedge((v1\_funct\_1 \\ & X3)\wedge(v1\_partfun1 X3 X0))))\Rightarrow(\forall X4.(m3\_pboole X4 X0 (k1\_mboolean \\ & X0 X1))\Rightarrow(((r1\_pboole X0 X2 X4)\wedge(r6\_pboole X0 (k3\_pboole X0 X2 X3) \\ & (k1\_pboole X0))\Rightarrow(r6\_pboole X0 (k3\_pboole X0 (k4\_mssubfam X0 X1 \\ & X4) X3) (k1\_pboole X0)))))) \end{aligned}$$