

t40\_algspec1  
(TMTh9EbykP6or7ze8c5ZELABtTKfrMfCret)

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Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_instalg1 : \iota \Rightarrow o$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $r1\_algspec1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r3\_pua2mss1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_algspec1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_algspec1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.((\neg v11\_struct\_0 X0) \wedge ((v1\_instalg1 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1.((\neg v11\_struct\_0 X1) \wedge ((v1\_instalg1 X1) \wedge (l1\_msualg\_1 \\ & X1))) \Rightarrow (\forall X2.((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3. \\ & ((v1\_relat\_1 X3) \wedge (v1\_funct\_1 X3)) \Rightarrow ((r3\_pua2mss1 X0 X1 X2 X3) \Rightarrow \\ & (r1\_algspec1 X0 X2 X3)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow (\forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((r1\_algspec1 X0 X1 X2) \Leftrightarrow (r1\_algspec1 \\ & X0 (k1\_algspec1 (u1\_struct\_0 X0) X1) (k1\_algspec1 (u4\_struct\_0 \\ & X0) X2)))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 \\ & X0) \wedge (l1\_msualg\_1 X0))) \wedge (((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \wedge \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)))) \Rightarrow ((\neg v2\_struct\_0 (k2\_algspec1 \\ & X0 X1 X2)) \wedge ((\neg v11\_struct\_0 (k2\_algspec1 X0 X1 X2)) \wedge ((v1\_msualg\_1 \\ & (k2\_algspec1 X0 X1 X2)) \wedge (l1\_msualg\_1 (k2\_algspec1 X0 X1 X2)))))) \end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow ((v1\_relat\_1 \\ & (k1\_algspec1 X0 X1)) \wedge ((v4\_relat\_1 (k1\_algspec1 X0 X1) X0) \wedge ((v1\_funct\_1 \\ & (k1\_algspec1 X0 X1)) \wedge (v1\_partfun1 (k1\_algspec1 X0 X1) X0)))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1. ((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow (\forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((r1\_algspec1 X0 X1 X2) \Rightarrow (\forall X3. \\ & ((\neg v2\_struct\_0 X3) \wedge ((\neg v11\_struct\_0 X3) \wedge ((v1\_msualg\_1 X3) \wedge \\ & l1\_msualg\_1 X3)))) \Rightarrow ((X3 = k2\_algspec1 X0 X1 X2) \Leftrightarrow ((r3\_pua2mss1 \\ & X0 X3 (k1\_algspec1 (u1\_struct\_0 X0) X1) (k1\_algspec1 (u4\_struct\_0 \\ & X0) X2)) \wedge ((u1\_struct\_0 X3 = k10\_xtuple\_0 (k1\_algspec1 (u1\_struct\_0 \\ & X0) X1)) \wedge (u4\_struct\_0 X3 = k10\_xtuple\_0 (k1\_algspec1 (u4\_struct\_0 \\ & X0) X2)))))))))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0. (l1\_msualg\_1 X0) \Rightarrow (((v2\_struct\_0 X0) \wedge (v1\_instalg1 X0)) \Rightarrow (v11\_struct\_0 X0)) \quad (6)$$

Assume the following.

$$\forall X0. (l1\_msualg\_1 X0) \Rightarrow ((\neg v2\_struct\_0 X0) \Rightarrow (v1\_instalg1 X0)) \quad (7)$$

**Theorem 1**

$$\begin{aligned} & \forall X0. ((\neg v11\_struct\_0 X0) \wedge ((v1\_instalg1 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1. ((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow (\forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((r1\_algspec1 X0 X1 X2) \Leftrightarrow (r3\_pua2mss1 \\ & X0 (k2\_algspec1 X0 X1 X2) (k1\_algspec1 (u1\_struct\_0 X0) X1) (k1\_algspec1 \\ & (u4\_struct\_0 X0) X2)))))) \end{aligned}$$