

# t41\_circrm1

(TMHHKU1EcpwJ6ELR9Sef23ne68Kp7JW61Ti)

October 27, 2020

Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_msafree2 : \iota \Rightarrow o$  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  $v4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v4\_msafree2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r4\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $r1\_tarski : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $r3\_pua2mss1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u2\_msualg\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_msualg\_1 : \iota \Rightarrow \iota$  be given. Let  $v2\_funct\_1 : \iota \Rightarrow o$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
& \forall X0.(l1\_msualg\_1 X0) \Rightarrow (\forall X1.(l1\_msualg\_1 X1) \Rightarrow (\forall X2. \\
& ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 \\
& X3) \wedge (v1\_funct\_1 X3)) \Rightarrow ((r3\_pua2mss1 X0 X1 X2 X3) \Leftrightarrow ((k9\_xtuple\_0 \\
& X2 = u1\_struct\_0 X0) \wedge ((k9\_xtuple\_0 X3 = u4\_struct\_0 X0) \wedge ((r1\_tarski \\
& (k10\_xtuple\_0 X2) (u1\_struct\_0 X1)) \wedge ((r1\_tarski (k10\_xtuple\_0 \\
& X3) (u4\_struct\_0 X1)) \wedge ((k3\_relat\_1 (u2\_msualg\_1 X0) X2 = k3\_relat\_1 \\
& X3 (u2\_msualg\_1 X1)) \wedge (\forall X4.\forall X5.((v1\_relat\_1 X5) \wedge \\
& (v1\_funct\_1 X5)) \Rightarrow (((X4 \in u4\_struct\_0 X0) \wedge (X5 = k1\_funct\_1 (u1\_msualg\_1 \\
& X0) X4)) \Rightarrow (k3\_relat\_1 X5 X2 = k1\_funct\_1 (u1\_msualg\_1 X1) (k1\_funct\_1 \\
& X3 X4)))))))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_msualg\_1 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge (l1\_msualg\_1 X1)) \Rightarrow (\forall X2.((v1\_relat\_1 \\
& X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 X3) \wedge (v1\_funct\_1 \\
& X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge (l3\_msualg\_1 X4 X0)) \Rightarrow ( \\
& \forall X5.((v4\_msualg\_1 X5 X1) \wedge (l3\_msualg\_1 X5 X1)) \Rightarrow ((r4\_circrm1 \\
& X0 X1 X2 X3 X4 X5) \Leftrightarrow ((v2\_funct\_1 X2) \wedge ((v2\_funct\_1 X3) \wedge ((r3\_pua2mss1 \\
& X0 X1 X2 X3) \wedge ((u3\_msualg\_1 X0 X4 = k3\_relat\_1 X2 (u3\_msualg\_1 X1 X5)) \wedge \\
& (u4\_msualg\_1 X0 X4 = k3\_relat\_1 X3 (u4\_msualg\_1 X1 X5)))))))))))))
\end{aligned} \tag{2}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (v2\_msafree2 \\ & X0) \wedge (l1\_msualg\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\ & v11\_struct\_0 X1) \wedge (v2\_msafree2 X1) \wedge (l1\_msualg\_1 X1)))) \Rightarrow (\forall X2. \\ & ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 \\ & X3) \wedge (v1\_funct\_1 X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge (v4\_msafree2 \\ & X4 X0) \wedge (l3\_msualg\_1 X4 X0)))) \Rightarrow (\forall X5.((v4\_msualg\_1 X5 X1) \wedge \\ & (v4\_msafree2 X5 X1) \wedge (l3\_msualg\_1 X5 X1)))) \Rightarrow ((r4\_circtrm1 X0 X1 \\ & X2 X3 X4 X5) \Rightarrow ((k9\_xtuple\_0 X2 = u1\_struct\_0 X0) \wedge ((r1\_tarski (k10\_xtuple\_0 \\ & X2) (u1\_struct\_0 X1)) \wedge ((k9\_xtuple\_0 X3 = u4\_struct\_0 X0) \wedge (r1\_tarski \\ & (k10\_xtuple\_0 X3) (u4\_struct\_0 X1)))))))))) \end{aligned}$$