

t27_circcmb3
(TMR9pBgtPeD8Gjxdr8vCvhNSxdZLxRrgSjL)

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Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $v1_finset_1 : \iota \Rightarrow o$ be given. Let $m1_circcmb3 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m2_circcmb3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r2_circcomb : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $r1_partfun1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k7_funcop_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r1_xboole_0 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v1_relat_1 : \iota \Rightarrow o$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v3_funct_1 : \iota \Rightarrow o$ be given. Let $k9_xtuple_0 : \iota \Rightarrow \iota$ be given. Let $k3_funct_1 : \iota \Rightarrow \iota$ be given. Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $l1_msualg_1 : \iota \Rightarrow o$ be given. Let $l3_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v4_circcomb : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u4_msualg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v1_circcomb : \iota \Rightarrow o$ be given. Let $v2_circcomb : \iota \Rightarrow o$ be given. Let $r1_circcomb : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $l2_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u3_msualg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v4_relat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $v1_partfun1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v4_msafree2 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v11_struct_0 : \iota \Rightarrow o$ be given. Let $v5_circcomb : \iota \Rightarrow o$ be given. Let $l5_struct_0 : \iota \Rightarrow o$ be given. Let $v4_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.(r1_partfun1 (k7_funcop_1 X0 X2) (k7_funcop_1 X1 X3)) \Leftrightarrow ((X2 = X3) \vee (r1_xboole_0 X0 X1)) \quad (1)$$

Assume the following.

$$\forall X0.((v1_relat_1 X0) \wedge ((v1_funct_1 X0) \wedge (v3_funct_1 X0))) \Rightarrow (X0 = k7_funcop_1 (k9_xtuple_0 X0) (k3_funct_1 X0)) \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2_struct_0 X0) \wedge (l1_msualg_1 X0)) \Rightarrow (\forall X1. \\ & ((\neg v2_struct_0 X1) \wedge (l1_msualg_1 X1)) \Rightarrow (\forall X2.(l3_msualg_1 \\ & X2 X0) \Rightarrow (\forall X3.(l3_msualg_1 X3 X1) \Rightarrow (((v4_circcomb X2 X0) \wedge \\ & (v4_circcomb X3 X1)) \Rightarrow (r1_partfun1 (u4_msualg_1 X0 X2) (u4_msualg_1 \\ & X1 X3)))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0) \wedge ((v1_circcomb X0) \wedge ((v2_circcomb \\ X0) \wedge (l1_msualg_1 X0)))) \Rightarrow (\forall X1.((\neg v2_struct_0 X1) \wedge ((v1_circcomb \\ X1) \wedge ((v2_circcomb X1) \wedge (l1_msualg_1 X1)))) \Rightarrow (r1_circcomb X0 X1)) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. ((l1_struct_0 X0) \wedge (l2_msualg_1 X1 X0)) \Rightarrow \\ ((v1_relat_1 (u3_msualg_1 X0 X1)) \wedge ((v4_relat_1 (u3_msualg_1 \\ X0 X1) (u1_struct_0 X0)) \wedge ((v1_funct_1 (u3_msualg_1 X0 X1)) \wedge (v1_partfun1 \\ (u3_msualg_1 X0 X1) (u1_struct_0 X0)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. (((\neg v1_xboole_0 X0) \wedge (v1_finset_1 X0)) \wedge \\ (m1_circcmb3 X1 X0)) \Rightarrow (\forall X2. (m2_circcmb3 X2 X0 X1) \Rightarrow ((v4_msafree2 \\ X2 X1) \wedge (l3_msualg_1 X2 X1))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0. ((\neg v1_xboole_0 X0) \wedge (v1_finset_1 X0)) \Rightarrow (\forall X1. \\ (m1_circcmb3 X1 X0) \Rightarrow ((\neg v2_struct_0 X1) \wedge ((\neg v11_struct_0 X1) \wedge \\ ((v1_circcomb X1) \wedge ((v2_circcomb X1) \wedge ((v5_circcomb X1) \wedge (l1_msualg_1 \\ X1))))))) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0. (l5_struct_0 X0) \Rightarrow (l1_struct_0 X0) \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0. ((\neg v2_struct_0 X0) \wedge (l1_msualg_1 X0)) \Rightarrow (\forall X1. \\ (l3_msualg_1 X1 X0) \Rightarrow (l2_msualg_1 X1 X0)) \end{aligned} \quad (9)$$

Assume the following.

$$\forall X0. (l1_msualg_1 X0) \Rightarrow (l5_struct_0 X0) \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0. ((\neg v2_struct_0 X0) \wedge (l1_msualg_1 X0)) \Rightarrow (\forall X1. \\ ((\neg v2_struct_0 X1) \wedge (l1_msualg_1 X1)) \Rightarrow (\forall X2. (l3_msualg_1 \\ X2 X0) \Rightarrow (\forall X3. (l3_msualg_1 X3 X1) \Rightarrow ((r2_circcomb X0 X1 X2 X3) \Leftrightarrow \\ ((r1_circcomb X0 X1) \wedge ((r1_partfun1 (u3_msualg_1 X0 X2) (u3_msualg_1 \\ X1 X3)) \wedge (r1_partfun1 (u4_msualg_1 X0 X2) (u4_msualg_1 X1 X3)))))))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v1_xboole_0 X0) \wedge (v1_finset_1 X0)) \Rightarrow (\forall X1. \\ & (m1_circcmb3 X1 X0) \Rightarrow (\forall X2.((v4_msafree2 X2 X1) \wedge (l3_msualg_1 \\ & X2 X1)) \Rightarrow ((m2_circcmb3 X2 X0 X1) \Leftrightarrow ((v4_circcomb X2 X1) \wedge ((v3_funct_1 \\ & (u3_msualg_1 X1 X2)) \wedge (k3_funct_1 (u3_msualg_1 X1 X2) = X0)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v1_xboole_0 X0) \wedge (v1_finset_1 X0)) \wedge \\ & (m1_circcmb3 X1 X0)) \Rightarrow (\forall X2. (m2_circcmb3 X2 X0 X1) \Rightarrow ((v4_msualg_1 \\ & X2 X1) \wedge (v4_circcomb X2 X1))) \end{aligned} \quad (13)$$

Theorem 1

$$\begin{aligned} & \forall X0. ((\neg v1_xboole_0 X0) \wedge (v1_finset_1 X0)) \Rightarrow (\forall X1. \\ & (m1_circcmb3 X1 X0) \Rightarrow (\forall X2. (m1_circcmb3 X2 X0) \Rightarrow (\forall X3. \\ & (m2_circcmb3 X3 X0 X1) \Rightarrow (\forall X4. (m2_circcmb3 X4 X0 X2) \Rightarrow (r2_circcomb \\ & X1 X2 X3 X4)))))) \end{aligned}$$