

t23_monoid_1 (TMKrtToBaABkKxnNSPoidUc- CoQCCQrgWUFpL)

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Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $l3_algstr_0 : \iota \Rightarrow o$ be given. Let $v5_group_1 : \iota \Rightarrow o$ be given. Let $k9_monoid_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v3_group_1 : \iota \Rightarrow o$ be given. Let $v10_monoid_0 : \iota \Rightarrow o$ be given. Let $v13_monoid_0 : \iota \Rightarrow o$ be given. Let $v16_monoid_0 : \iota \Rightarrow o$ be given. Let $v17_monoid_0 : \iota \Rightarrow o$ be given. Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v1_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k2_zfmisc_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_zfmisc_1 : \iota \Rightarrow \iota$ be given. Let $v2_binop_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k8_monoid_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k9_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v1_binop_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $r1_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u2_algstr_0 : \iota \Rightarrow \iota$ be given. Let $v9_monoid_0 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v8_monoid_0 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v5_monoid_0 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v3_binop_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (\forall X2. ((v1_funct_1 \\ & X2) \wedge ((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1) \wedge (m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1)))))) \Rightarrow ((v2_binop_1 X2 X1) \Rightarrow \\ & (v2_binop_1 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (\forall X2. ((v1_funct_1 \\ & X2) \wedge ((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1) \wedge (m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1)))))) \Rightarrow ((v1_binop_1 X2 X1) \Rightarrow \\ & (v1_binop_1 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((\neg v2_struct_0 X1)\wedge(l3_algstr_0 X1))\Rightarrow \\ & ((u1_struct_0 (k9_monoid_1 X1 X0) = k9_funct_2 X0 (u1_struct_0 \\ & X1))\wedge(r1_funct_2 (k2_zfmisc_1 (u1_struct_0 (k9_monoid_1 X1 X0)) \\ & (u1_struct_0 (k9_monoid_1 X1 X0))) (u1_struct_0 (k9_monoid_1 \\ & X1 X0)) (k2_zfmisc_1 (k9_funct_2 X0 (u1_struct_0 X1)) (k9_funct_2 \\ & X0 (u1_struct_0 X1))) (k9_funct_2 X0 (u1_struct_0 X1)) (u2_algstr_0 \\ & (k9_monoid_1 X1 X0)) (k8_monoid_1 (u1_struct_0 X1) (u1_struct_0 \\ & X1) (u1_struct_0 X1) (u2_algstr_0 X1) X0))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(\neg v1_xboole_0 X1)\Rightarrow(\forall X2.((v1_funct_1 \\ & X2)\wedge((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1))))))\Rightarrow((v9_monoid_0 X2 X1)\Rightarrow \\ & (v9_monoid_0 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(\neg v1_xboole_0 X1)\Rightarrow(\forall X2.((v1_funct_1 \\ & X2)\wedge((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1))))))\Rightarrow((v8_monoid_0 X2 X1)\Rightarrow \\ & (v8_monoid_0 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(\neg v1_xboole_0 X1)\Rightarrow(\forall X2.((v1_funct_1 \\ & X2)\wedge((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1))))))\Rightarrow((v5_monoid_0 X2 X1)\Rightarrow \\ & (v5_monoid_0 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(\neg v1_xboole_0 X1)\Rightarrow(\forall X2.((v1_funct_1 \\ & X2)\wedge((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1))))))\Rightarrow((v3_binop_1 X2 X1)\Rightarrow \\ & (v3_binop_1 (k8_monoid_1 X1 X1 X1 X2 X0) (k9_funct_2 X0 X1)))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & ((\neg v1_xboole_0 X1)\wedge((\neg v1_xboole_0 X3)\wedge(((v1_funct_1 X4)\wedge((\\ & v1_funct_2 X4 X0 X1)\wedge(m1_subset_1 X4 (k1_zfmisc_1 (k2_zfmisc_1 \\ & X0 X1))))))\wedge((v1_funct_1 X5)\wedge((v1_funct_2 X5 X2 X3)\wedge(m1_subset_1 \\ & X5 (k1_zfmisc_1 (k2_zfmisc_1 X2 X3))))))))\Rightarrow((r1_funct_2 X0 X1 \\ & X2 X3 X4 X5)\Leftrightarrow(X4 = X5)) \end{aligned} \quad (8)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(l1_struct_0 X0))\Rightarrow(\neg v1_xboole_0 (u1_struct_0 X0)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v2_struct_0 X0)\wedge(l3_algstr_0 X0))\Rightarrow(\neg v2_struct_0 (k9_monoid_1 X0 X1)) \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0.(l3_algstr_0 X0)\Rightarrow&((v1_funct_1 (u2_algstr_0 X0))\wedge \\ &((v1_funct_2 (u2_algstr_0 X0) (k2_zfmisc_1 (u1_struct_0 X0) (\\ &u1_struct_0 X0)) (u1_struct_0 X0))\wedge(m1_subset_1 (u2_algstr_0 \\ &X0) (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 (u1_struct_0 X0) (\\ &u1_struct_0 X0)) (u1_struct_0 X0)))))) \quad (11) \end{aligned}$$

Assume the following.

$$\forall X0.(l3_algstr_0 X0)\Rightarrow(l1_struct_0 X0) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v2_struct_0 X0)\wedge(l3_algstr_0 X0))\Rightarrow(l3_algstr_0 (k9_monoid_1 X0 X1)) \quad (13)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1_xboole_0 \\ X0)\wedge((\neg v1_xboole_0 X1)\wedge((\neg v1_xboole_0 X2)\wedge((v1_funct_1 X3)\wedge \\ ((v1_funct_2 X3 (k2_zfmisc_1 X0 X1) X2)\wedge(m1_subset_1 X3 (k1_zfmisc_1 \\ (k2_zfmisc_1 (k2_zfmisc_1 X0 X1) X2)))))))\Rightarrow((v1_funct_1 (k8_monoid_1 \\ X0 X1 X2 X3 X4))\wedge((v1_funct_2 (k8_monoid_1 X0 X1 X2 X3 X4) (k2_zfmisc_1 \\ (k9_funct_2 X4 X0) (k9_funct_2 X4 X1)) (k9_funct_2 X4 X2))\wedge(m1_subset_1 \\ (k8_monoid_1 X0 X1 X2 X3 X4) (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 \\ (k9_funct_2 X4 X0) (k9_funct_2 X4 X1)) (k9_funct_2 X4 X2)))))) \quad (14) \end{aligned}$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(l3_algstr_0 X0))\Rightarrow((v17_monoid_0 X0)\Leftrightarrow(v9_monoid_0 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (15)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(l3_algstr_0 X0))\Rightarrow((v16_monoid_0 X0)\Leftrightarrow(v8_monoid_0 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (16)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0)\wedge(l3_algstr_0 X0))\Rightarrow((v13_monoid_0 X0)\Leftrightarrow(v5_monoid_0 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (17)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0) \wedge (l3_algstr_0 X0)) \Rightarrow ((v10_monoid_0 X0) \Leftrightarrow (v3_binop_1 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (18)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0) \wedge (l3_algstr_0 X0)) \Rightarrow ((v3_group_1 X0) \Leftrightarrow (v2_binop_1 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (19)$$

Assume the following.

$$\forall X0.((\neg v2_struct_0 X0) \wedge (l3_algstr_0 X0)) \Rightarrow ((v5_group_1 X0) \Leftrightarrow (v1_binop_1 (u2_algstr_0 X0) (u1_struct_0 X0))) \quad (20)$$

Theorem 1

$$\forall X0.((\neg v2_struct_0 X0) \wedge (l3_algstr_0 X0)) \Rightarrow (\forall X1. ((v5_group_1 X0) \Rightarrow (v5_group_1 (k9_monoid_1 X0 X1))) \wedge (((v3_group_1 X0) \Rightarrow (v3_group_1 (k9_monoid_1 X0 X1))) \wedge (((v10_monoid_0 X0) \Rightarrow (v10_monoid_0 (k9_monoid_1 X0 X1))) \wedge (((v13_monoid_0 X0) \Rightarrow (v13_monoid_0 (k9_monoid_1 X0 X1))) \wedge (((v16_monoid_0 X0) \Rightarrow (v16_monoid_0 (k9_monoid_1 X0 X1))) \wedge ((v17_monoid_0 X0) \Rightarrow (v17_monoid_0 (k9_monoid_1 X0 X1))))))))))$$