

t10_monoid_1

(TMH2X9r8gSZ4XwQUtRBnbf5VzKM8fbUfoVt)

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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 $v1_setwiseo : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k4_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k9_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k8_monoid_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5_monoid_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r3_binop_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m1_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m2_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (\forall X2. (m1_subset_1 \\ & X2 X1) \Rightarrow (\forall X3. ((v1_funct_1 X3) \wedge ((v1_funct_2 X3 (k2_zfmisc_1 \\ & X1 X1) X1) \wedge (m1_subset_1 X3 (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 \\ & X1 X1) X1)))) \Rightarrow ((r3_binop_1 X1 X2 X3) \Rightarrow (r3_binop_1 (k9_funct_2 \\ & X0 X1) (k5_monoid_1 X1 X0 X2) (k8_monoid_1 X1 X1 X1 X3 X0)))))) \end{aligned} \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. ((\neg v1_xboole_0 X1) \wedge (m1_funct_2 X2 X0 X1)) \Rightarrow (\forall X3. (m2_funct_2 X3 X0 X1 X2) \Leftrightarrow (m1_subset_1 X3 X2)) \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (k9_funct_2 X0 X1 = k1_funct_2 X0 X1) \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (\neg v1_xboole_0 (k1_funct_2 X0 X1)) \quad (4)$$

Assume the following.

$$\forall X0. \forall X1. (\neg v1_xboole_0 X1) \Rightarrow (m1_funct_2 (k9_funct_2 X0 X1) X0 X1) \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((\neg v1_xboole_0 \\ & X0)\wedge((\neg v1_xboole_0 X1)\wedge((\neg v1_xboole_0 X2)\wedge((v1_funct_1 X3)\wedge \\ & ((v1_funct_2 X3 (k2_zfmisc_1 X0 X1) X2)\wedge(m1_subset_1 X3 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X0 X1) X2))))))\Rightarrow((v1_funct_1 (k8_monoid_1 \\ & X0 X1 X2 X3 X4)\wedge((v1_funct_2 (k8_monoid_1 X0 X1 X2 X3 X4) (k2_zfmisc_1 \\ & (k9_funct_2 X4 X0) (k9_funct_2 X4 X1)) (k9_funct_2 X4 X2))\wedge(m1_subset_1 \\ & (k8_monoid_1 X0 X1 X2 X3 X4) (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 \\ & (k9_funct_2 X4 X0) (k9_funct_2 X4 X1)) (k9_funct_2 X4 X2)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.((\neg v1_xboole_0 X0)\wedge(m1_subset_1 \\ & X2 X0))\Rightarrow(m2_funct_2 (k5_monoid_1 X0 X1 X2) X1 X0 (k9_funct_2 X1 X0)) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_funct_1 X1)\wedge((v1_funct_2 X1 (k2_zfmisc_1 \\ & X0 X0) X0)\wedge(m1_subset_1 X1 (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 \\ & X0 X0) X0))))\Rightarrow(m1_subset_1 (k4_binop_1 X0 X1) X0) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((v1_funct_1 X1)\wedge((v1_funct_2 X1 (k2_zfmisc_1 \\ & X0 X0) X0)\wedge(m1_subset_1 X1 (k1_zfmisc_1 (k2_zfmisc_1 (k2_zfmisc_1 \\ & X0 X0) X0))))\Rightarrow((\exists X2.(m1_subset_1 X2 X0)\wedge(r3_binop_1 X0 \\ & X2 X1))\Rightarrow(\forall X2.(m1_subset_1 X2 X0)\Rightarrow((X2 = k4_binop_1 X0 X1)\Leftrightarrow \\ & (r3_binop_1 X0 X2 X1)))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & \forall X0.(\neg v1_xboole_0 X0)\Rightarrow(\forall X1.((v1_funct_1 X1)\wedge(\\ & (v1_funct_2 X1 (k2_zfmisc_1 X0 X0) X0)\wedge(m1_subset_1 X1 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X0 X0) X0))))\Rightarrow((v1_setwiseo X1 X0)\Leftrightarrow \\ & (\exists X2.(m1_subset_1 X2 X0)\wedge(r3_binop_1 X0 X2 X1)))) \end{aligned} \quad (10)$$

Theorem 1

$$\begin{aligned} & \forall X0.\forall X1.(\neg v1_xboole_0 X1)\Rightarrow(\forall X2.((v1_funct_1 \\ & X2)\wedge((v1_funct_2 X2 (k2_zfmisc_1 X1 X1) X1)\wedge(m1_subset_1 X2 (k1_zfmisc_1 \\ & (k2_zfmisc_1 (k2_zfmisc_1 X1 X1) X1))))\Rightarrow((v1_setwiseo X2 X1)\Rightarrow \\ & ((k4_binop_1 (k9_funct_2 X0 X1) (k8_monoid_1 X1 X1 X1 X2 X0) = k5_monoid_1 \\ & X1 X0 (k4_binop_1 X1 X2))\wedge(v1_setwiseo (k8_monoid_1 X1 X1 X1 X2 X0) \\ & (k9_funct_2 X0 X1)))))) \end{aligned}$$