

# t16\_modcat\_1 (TMXXApufEwn- QqXxCN6HUNUpF9bHs4GnmFve)

October 27, 2020

Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $v1\_classes2 : \iota \Rightarrow o$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v13\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $v2\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v3\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v4\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v3\_group\_1 : \iota \Rightarrow o$  be given. Let  $v4\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $v5\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $l6\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k11\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m4\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k10\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  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  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $g1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $k6\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_binop\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v5\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u1\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u2\_graph\_1 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v1\_xboole\_0 X0) \wedge (v1\_classes2 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v2\_rlvect\_1 X1) \wedge (( \\
& v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 X1) \wedge ((v4\_vectsp\_1 \\
& X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1)))))))) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u4\_struct\_0 (k11\_modcat\_1 X0 X1))) \Rightarrow (\forall X3. \\
& (m4\_modcat\_1 X3 X1 (k4\_modcat\_1 X1 (k3\_modcat\_1 X0 X1))) \Rightarrow ((X2 = \\
& X3) \Rightarrow ((k3\_graph\_1 (k11\_modcat\_1 X0 X1) X2 = k2\_mod\_2 X1 X3) \wedge (k4\_graph\_1 \\
& (k11\_modcat\_1 X0 X1) X2 = k3\_mod\_2 X1 X3))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.\forall X1.((v1\_relat\_1 X1)\wedge(v4\_relat\_1 X1 X0))\Rightarrow(k1\_relset\_1 X0 X1 = k9\_xtuple\_0 X1) \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((v1\_funct\_1 \\ & X2)\wedge((v1\_funct\_2 X2 X1 X0)\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & X1 X0))))))\wedge(((v1\_funct\_1 X3)\wedge((v1\_funct\_2 X3 X1 X0)\wedge(m1\_subset\_1 \\ & X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0))))))\wedge((v1\_funct\_1 X4)\wedge(m1\_subset\_1 \\ & X4 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X1) X1))))))\Rightarrow(\forall X5. \\ & \forall X6.\forall X7.\forall X8.\forall X9.(g1\_cat\_1 X0 X1 X2 \\ & X3 X4 = g1\_cat\_1 X5 X6 X7 X8 X9)\Rightarrow((X0 = X5)\wedge((X1 = X6)\wedge((X2 = X7)\wedge((X3 = \\ & X8)\wedge(X4 = X9)))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((v13\_algstr\_0 X0)\wedge \\ & ((v2\_rlvect\_1 X0)\wedge((v3\_rlvect\_1 X0)\wedge((v4\_rlvect\_1 X0)\wedge((v3\_group\_1 \\ & X0)\wedge((v4\_vectsp\_1 X0)\wedge((v5\_vectsp\_1 X0)\wedge(l6\_algstr\_0 X0))))))))))\wedge \\ & (m1\_modcat\_1 X1 X0))\Rightarrow((v1\_funct\_1 (k9\_modcat\_1 X0 X1))\wedge((v1\_funct\_2 \\ & (k9\_modcat\_1 X0 X1) (k4\_modcat\_1 X0 X1) X1)\wedge(m1\_subset\_1 (k9\_modcat\_1 \\ & X0 X1) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k4\_modcat\_1 X0 X1) X1)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((v13\_algstr\_0 X0)\wedge \\ & ((v2\_rlvect\_1 X0)\wedge((v3\_rlvect\_1 X0)\wedge((v4\_rlvect\_1 X0)\wedge((v3\_group\_1 \\ & X0)\wedge((v4\_vectsp\_1 X0)\wedge((v5\_vectsp\_1 X0)\wedge(l6\_algstr\_0 X0))))))))))\wedge \\ & (m1\_modcat\_1 X1 X0))\Rightarrow((v1\_funct\_1 (k8\_modcat\_1 X0 X1))\wedge((v1\_funct\_2 \\ & (k8\_modcat\_1 X0 X1) (k4\_modcat\_1 X0 X1) X1)\wedge(m1\_subset\_1 (k8\_modcat\_1 \\ & X0 X1) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k4\_modcat\_1 X0 X1) X1)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((\neg v1\_xboole\_0 X0)\wedge(v1\_classes2 X0))\wedge \\ & ((\neg v2\_struct\_0 X1)\wedge((v13\_algstr\_0 X1)\wedge((v2\_rlvect\_1 X1)\wedge(( \\ & v3\_rlvect\_1 X1)\wedge((v4\_rlvect\_1 X1)\wedge((v3\_group\_1 X1)\wedge((v4\_vectsp\_1 \\ & X1)\wedge((v5\_vectsp\_1 X1)\wedge(l6\_algstr\_0 X1))))))))))\Rightarrow(m1\_modcat\_1 \\ & (k3\_modcat\_1 X0 X1) X1) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((\neg v1\_xboole\_0 X0)\wedge(v1\_classes2 X0))\wedge \\ & ((\neg v2\_struct\_0 X1)\wedge((v13\_algstr\_0 X1)\wedge((v2\_rlvect\_1 X1)\wedge(( \\ & v3\_rlvect\_1 X1)\wedge((v4\_rlvect\_1 X1)\wedge((v3\_group\_1 X1)\wedge((v4\_vectsp\_1 \\ & X1)\wedge((v5\_vectsp\_1 X1)\wedge(l6\_algstr\_0 X1))))))))))\Rightarrow((v1\_cat\_1 \\ & (k11\_modcat\_1 X0 X1))\wedge(l1\_cat\_1 (k11\_modcat\_1 X0 X1))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 X0) \wedge \\ & ((v2\_rlvect\_1 X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge (v3\_group\_1 \\ & X0) \wedge (v4\_vectsp\_1 X0) \wedge (v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))) \wedge \\ & (m1\_modcat\_1 X1 X0) \Rightarrow ((v1\_funct\_1 (k10\_modcat\_1 X0 X1)) \wedge (m1\_subset\_1 \\ & (k10\_modcat\_1 X0 X1) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 ( \\ & k4\_modcat\_1 X0 X1) (k4\_modcat\_1 X0 X1)) (k4\_modcat\_1 X0 X1)))))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\ & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ( \\ & v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0))))))) \Rightarrow \\ & (\forall X1. (m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2. (m4\_modcat\_1 X2 X0 \\ & (k4\_modcat\_1 X0 X1)) \Rightarrow (k6\_modcat\_1 X0 X1 X2 = k3\_mod\_2 X0 X2))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\ & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ( \\ & v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0))))))) \Rightarrow \\ & (\forall X1. (m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2. (m4\_modcat\_1 X2 X0 \\ & (k4\_modcat\_1 X0 X1)) \Rightarrow (k5\_modcat\_1 X0 X1 X2 = k2\_mod\_2 X0 X2))) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0. (l1\_cat\_1 X0) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (u4\_struct\_0 \\ & X0)) \Rightarrow (\forall X2. (m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow ((k4\_tarSKI \\ & X2 X1 \in k9\_xtuple\_0 (u1\_cat\_1 X0)) \Rightarrow (k1\_cat\_1 X0 X1 X2 = k1\_binop\_1 \\ & (u1\_cat\_1 X0) X2 X1)))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v1\_xboole\_0 X0) \wedge (v1\_classes2 X0)) \Rightarrow (\forall X1. \\ & (((\neg v2\_struct\_0 X1) \wedge (v13\_algstr\_0 X1) \wedge ((v2\_rlvect\_1 X1) \wedge ( \\ & v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 X1) \wedge ((v4\_vectsp\_1 \\ & X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1))))))) \Rightarrow (k11\_modcat\_1 \\ & X0 X1 = g1\_cat\_1 (k3\_modcat\_1 X0 X1) (k4\_modcat\_1 X1 (k3\_modcat\_1 \\ & X0 X1)) (k8\_modcat\_1 X1 (k3\_modcat\_1 X0 X1)) (k9\_modcat\_1 X1 (k3\_modcat\_1 \\ & X0 X1)) (k10\_modcat\_1 X1 (k3\_modcat\_1 X0 X1)))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\
& X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge \\
& (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))) \Rightarrow \\
& (\forall X1.(m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2.((v1\_funct\_1 X2) \wedge \\
& (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 (k4\_modcat\_1 \\
& X0 X1) (k4\_modcat\_1 X0 X1)) (k4\_modcat\_1 X0 X1)))) \Rightarrow ((X2 = k10\_modcat\_1 \\
& X0 X1) \Leftrightarrow ((\forall X3.(m4\_modcat\_1 X3 X0 (k4\_modcat\_1 X0 X1)) \Rightarrow (\forall X4. \\
& (m4\_modcat\_1 X4 X0 (k4\_modcat\_1 X0 X1)) \Rightarrow ((k4\_tarski X3 X4 \in k1\_relset\_1 \\
& (k2\_zfmisc\_1 (k4\_modcat\_1 X0 X1) (k4\_modcat\_1 X0 X1)) X2) \Leftrightarrow (k5\_modcat\_1 \\
& X0 X1 X3 = k6\_modcat\_1 X0 X1 X4)))) \wedge (\forall X3.(m4\_modcat\_1 X3 X0 \\
& (k4\_modcat\_1 X0 X1)) \Rightarrow (\forall X4.(m4\_modcat\_1 X4 X0 (k4\_modcat\_1 \\
& X0 X1)) \Rightarrow ((k4\_tarski X3 X4 \in k1\_relset\_1 (k2\_zfmisc\_1 (k4\_modcat\_1 \\
& X0 X1) (k4\_modcat\_1 X0 X1)) X2) \Rightarrow (k1\_binop\_1 X2 X3 X4 = k8\_mod\_2 X0 \\
& X3 X4)))))))))
\end{aligned} \tag{13}$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \Rightarrow ((v4\_relat\_1 X2 X0) \wedge (v5\_relat\_1 X2 X1)) \tag{14}$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1))) \Rightarrow (v1\_relat\_1 X2) \tag{15}$$

Assume the following.

$$\forall X0. (l1\_cat\_1 X0) \Rightarrow ((v1\_cat\_1 X0) \Rightarrow (X0 = g1\_cat\_1 (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 X0))) \tag{16}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v1\_xboole\_0 X0) \wedge (v1\_classes2 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v2\_rlvect\_1 X1) \wedge (( \\
& v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 X1) \wedge ((v4\_vectsp\_1 \\
& X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1)))))))) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u4\_struct\_0 (k11\_modcat\_1 X0 X1))) \Rightarrow (\forall X3. \\
& (m1\_subset\_1 X3 (u4\_struct\_0 (k11\_modcat\_1 X0 X1))) \Rightarrow (\forall X4. \\
& (m4\_modcat\_1 X4 X1 (k4\_modcat\_1 X1 (k3\_modcat\_1 X0 X1))) \Rightarrow (\forall X5. \\
& (m4\_modcat\_1 X5 X1 (k4\_modcat\_1 X1 (k3\_modcat\_1 X0 X1))) \Rightarrow (((X2 = \\
& X4) \wedge (X3 = X5)) \Rightarrow (((k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3 = k4\_graph\_1 \\
& (k11\_modcat\_1 X0 X1) X2) \Rightarrow (k2\_mod\_2 X1 X5 = k3\_mod\_2 X1 X4)) \wedge (((k2\_mod\_2 \\
& X1 X5 = k3\_mod\_2 X1 X4) \Rightarrow (k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3 = k4\_graph\_1 \\
& (k11\_modcat\_1 X0 X1) X2)) \wedge (((k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3 = \\
& k4\_graph\_1 (k11\_modcat\_1 X0 X1) X2) \Rightarrow (k4\_tarski X5 X4 \in k1\_relset\_1 \\
& (k2\_zfmisc\_1 (k4\_modcat\_1 X1 (k3\_modcat\_1 X0 X1)) (k4\_modcat\_1 \\
& X1 (k3\_modcat\_1 X0 X1))) (k10\_modcat\_1 X1 (k3\_modcat\_1 X0 X1)))) \wedge \\
& (((k4\_tarski X5 X4 \in k1\_relset\_1 (k2\_zfmisc\_1 (k4\_modcat\_1 X1 ( \\
& k3\_modcat\_1 X0 X1)) (k4\_modcat\_1 X1 (k3\_modcat\_1 X0 X1))) (k10\_modcat\_1 \\
& X1 (k3\_modcat\_1 X0 X1))) \Rightarrow (k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3 = k4\_graph\_1 \\
& (k11\_modcat\_1 X0 X1) X2)) \wedge (((k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3 = \\
& k4\_graph\_1 (k11\_modcat\_1 X0 X1) X2) \Rightarrow (k1\_cat\_1 (k11\_modcat\_1 X0 \\
& X1) X2 X3 = k8\_mod\_2 X1 X5 X4)) \wedge (((k3\_graph\_1 (k11\_modcat\_1 X0 X1) \\
& X2 = k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3) \Rightarrow (k2\_mod\_2 X1 X4 = k2\_mod\_2 \\
& X1 X5)) \wedge (((k2\_mod\_2 X1 X4 = k2\_mod\_2 X1 X5) \Rightarrow (k3\_graph\_1 (k11\_modcat\_1 \\
& X0 X1) X2 = k3\_graph\_1 (k11\_modcat\_1 X0 X1) X3)) \wedge (((k4\_graph\_1 ( \\
& k11\_modcat\_1 X0 X1) X2 = k4\_graph\_1 (k11\_modcat\_1 X0 X1) X3) \Rightarrow (k3\_mod\_2 \\
& X1 X4 = k3\_mod\_2 X1 X5)) \wedge ((k3\_mod\_2 X1 X4 = k3\_mod\_2 X1 X5) \Rightarrow (k4\_graph\_1 \\
& (k11\_modcat\_1 X0 X1) X2 = k4\_graph\_1 (k11\_modcat\_1 X0 X1) X3)))))))))))))
\end{aligned}$$