

## t9\_modcat\_1

(TMKS8byZXJzCJ5dtf231BCxHtm9vm6nNFoN)

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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  $m1\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow o$  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  $k5\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v7\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v8\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v9\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v10\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v11\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_mod\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m3\_modcat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_mod\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_mod\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_mod\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\
 & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ( \\
 & (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0))))))) \Rightarrow \\
 & (\forall X1.(m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2.(m4\_modcat\_1 X2 X0 \\
 & (k4\_modcat\_1 X0 X1)) \Rightarrow (\forall X3.(m4\_modcat\_1 X3 X0 (k4\_modcat\_1 \\
 & X0 X1)) \Rightarrow (\neg (k5\_modcat\_1 X0 X1 X2 = k6\_modcat\_1 X0 X1 X3) \wedge (\forall X4. \\
 & ((v7\_vectsp\_1 X4 X0) \wedge (m2\_modcat\_1 X4 X0 X1)) \Rightarrow (\forall X5.((v7\_vectsp\_1 \\
 & X5 X0) \wedge (m2\_modcat\_1 X5 X0 X1)) \Rightarrow (\forall X6.((v7\_vectsp\_1 X6 X0) \wedge \\
 & (m2\_modcat\_1 X6 X0 X1)) \Rightarrow (\neg (m1\_mod\_2 X2 X0 X5 X6) \wedge (m1\_mod\_2 X3 X0 \\
 & X4 X5))))))))))
 \end{aligned}
 \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_group\_1 \\
& X0) \wedge ((v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge ((v2\_rlvect\_1 X0) \wedge \\
& ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\
& (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v8\_vectsp\_1 \\
& X1 X0) \wedge ((v9\_vectsp\_1 X1 X0) \wedge ((v10\_vectsp\_1 X1 X0) \wedge ((v11\_vectsp\_1 \\
& X1 X0) \wedge ((v2\_rlvect\_1 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge \\
& (l1\_vectsp\_1 X1 X0)))))))))) \Rightarrow (\forall X2.((\neg v2\_struct\_0 X2) \wedge \\
& ((v13\_algstr\_0 X2) \wedge ((v8\_vectsp\_1 X2 X0) \wedge ((v9\_vectsp\_1 X2 X0) \wedge \\
& ((v10\_vectsp\_1 X2 X0) \wedge ((v11\_vectsp\_1 X2 X0) \wedge ((v2\_rlvect\_1 X2) \wedge \\
& ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge (l1\_vectsp\_1 X2 X0)))))))))) \Rightarrow \\
& (\forall X3.((\neg v2\_struct\_0 X3) \wedge ((v13\_algstr\_0 X3) \wedge ((v8\_vectsp\_1 \\
& X3 X0) \wedge ((v9\_vectsp\_1 X3 X0) \wedge ((v10\_vectsp\_1 X3 X0) \wedge ((v11\_vectsp\_1 \\
& X3 X0) \wedge ((v2\_rlvect\_1 X3) \wedge ((v3\_rlvect\_1 X3) \wedge ((v4\_rlvect\_1 X3) \wedge \\
& (l1\_vectsp\_1 X3 X0)))))))))) \Rightarrow (\forall X4.(m1\_mod\_2 X4 X0 X1 X2) \Rightarrow \\
& (\forall X5.(m1\_mod\_2 X5 X0 X3 X1) \Rightarrow ((v2\_mod\_2 (k8\_mod\_2 X0 X4 X5) \\
& X0) \wedge (m1\_mod\_2 (k8\_mod\_2 X0 X4 X5) X0 X3 X2))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge \\
& ((v2\_rlvect\_1 X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 \\
& X0) \wedge ((v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \wedge \\
& (m3\_modcat\_1 X1 X0) \Rightarrow (\forall X2.(m4\_modcat\_1 X2 X0 X1) \Leftrightarrow (m1\_subset\_1 \\
& X2 X1))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge \\
& ((v2\_rlvect\_1 X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 \\
& X0) \wedge ((v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \wedge \\
& (m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2.(m2\_modcat\_1 X2 X0 X1) \Rightarrow ((\neg v2\_struct\_0 \\
& X2) \wedge ((v13\_algstr\_0 X2) \wedge ((v2\_rlvect\_1 X2) \wedge ((v3\_rlvect\_1 X2) \wedge \\
& ((v4\_rlvect\_1 X2) \wedge ((v8\_vectsp\_1 X2 X0) \wedge ((v9\_vectsp\_1 X2 X0) \wedge \\
& ((v10\_vectsp\_1 X2 X0) \wedge ((v11\_vectsp\_1 X2 X0) \wedge (l1\_vectsp\_1 X2 X0))))))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 \\
& X0) \wedge (v3\_group\_1 X0) \wedge (v4\_vectsp\_1 X0) \wedge (v5\_vectsp\_1 X0) \wedge \\
& (v2\_rlvect\_1 X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge (l6\_algstr\_0 \\
& X0)))))) \wedge (((\neg v2\_struct\_0 X1) \wedge (v13\_algstr\_0 X1) \wedge (v8\_vectsp\_1 \\
& X1 X0) \wedge (v9\_vectsp\_1 X1 X0) \wedge (v10\_vectsp\_1 X1 X0) \wedge (v11\_vectsp\_1 \\
& X1 X0) \wedge (v2\_rlvect\_1 X1) \wedge (v3\_rlvect\_1 X1) \wedge (v4\_rlvect\_1 X1) \wedge \\
& (l1\_vectsp\_1 X1 X0)))))) \wedge ((\neg v2\_struct\_0 X2) \wedge (v13\_algstr\_0 \\
& X2) \wedge (v8\_vectsp\_1 X2 X0) \wedge (v9\_vectsp\_1 X2 X0) \wedge (v10\_vectsp\_1 \\
& X2 X0) \wedge (v11\_vectsp\_1 X2 X0) \wedge (v2\_rlvect\_1 X2) \wedge (v3\_rlvect\_1 \\
& X2) \wedge (v4\_rlvect\_1 X2) \wedge (l1\_vectsp\_1 X2 X0)))))) \Rightarrow (\forall X3. \\
& (m1\_mod\_2 X3 X0 X1 X2) \Rightarrow ((v3\_mod\_2 X3 X0) \wedge (l1\_mod\_2 X3 X0)))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 \\
& X0) \wedge (v2\_rlvect\_1 X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge \\
& ((v3\_group\_1 X0) \wedge (v4\_vectsp\_1 X0) \wedge (v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 \\
& X0)))))) \wedge ((m1\_modcat\_1 X1 X0) \wedge (m1\_subset\_1 X2 (k4\_modcat\_1 \\
& X0 X1))) \Rightarrow (m2\_modcat\_1 (k6\_modcat\_1 X0 X1 X2) X0 X1)
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 \\
& X0) \wedge (v2\_rlvect\_1 X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge \\
& ((v3\_group\_1 X0) \wedge (v4\_vectsp\_1 X0) \wedge (v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 \\
& X0)))))) \wedge ((m1\_modcat\_1 X1 X0) \wedge (m1\_subset\_1 X2 (k4\_modcat\_1 \\
& X0 X1))) \Rightarrow (m2\_modcat\_1 (k5\_modcat\_1 X0 X1 X2) X0 X1)
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 X0) \wedge \\
& (v2\_rlvect\_1 X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge (v3\_group\_1 \\
& X0) \wedge (v4\_vectsp\_1 X0) \wedge (v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))) \wedge \\
& (m1\_modcat\_1 X1 X0) \Rightarrow (m3\_modcat\_1 (k4\_modcat\_1 X0 X1) X0)
\end{aligned} \tag{8}$$

Assume the following.

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

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_group\_1 \\
& X0) \wedge ((v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge ((v2\_rlvect\_1 X0) \wedge ( \\
& ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\
& (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v8\_vectsp\_1 \\
& X1 X0) \wedge ((v9\_vectsp\_1 X1 X0) \wedge ((v10\_vectsp\_1 X1 X0) \wedge ((v11\_vectsp\_1 \\
& X1 X0) \wedge ((v2\_rlvect\_1 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ( \\
& (l1\_vectsp\_1 X1 X0)))))))))) \Rightarrow (\forall X2.((\neg v2\_struct\_0 X2) \wedge ( \\
& ((v13\_algstr\_0 X2) \wedge ((v8\_vectsp\_1 X2 X0) \wedge ((v9\_vectsp\_1 X2 X0) \wedge ( \\
& ((v10\_vectsp\_1 X2 X0) \wedge ((v11\_vectsp\_1 X2 X0) \wedge ((v2\_rlvect\_1 X2) \wedge ( \\
& ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge (l1\_vectsp\_1 X2 X0)))))))))) \Rightarrow \\
& (\forall X3.((v3\_mod\_2 X3 X0) \wedge (l1\_mod\_2 X3 X0)) \Rightarrow ((m1\_mod\_2 X3 \\
& X0 X1 X2) \Leftrightarrow ((k2\_mod\_2 X0 X3 = X1) \wedge (k3\_mod\_2 X0 X3 = X2)))))) \\
& \tag{11}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\
& X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ( \\
& (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\
& (\forall X1.(m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2.(m3\_modcat\_1 X2 X0) \Rightarrow \\
& ((X2 = k4\_modcat\_1 X0 X1) \Leftrightarrow (\forall X3.(X3 \in X2) \Leftrightarrow (\exists X4.((v7\_vectsp\_1 \\
& X4 X0) \wedge (m2\_modcat\_1 X4 X0 X1) \wedge (\exists X5.((v7\_vectsp\_1 X5 X0) \wedge ( \\
& (m2\_modcat\_1 X5 X0 X1) \wedge ((v2\_mod\_2 X3 X0) \wedge (m1\_mod\_2 X3 X0 X4 X5)))))))))) \\
& \tag{12}
\end{aligned}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\
& X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ( \\
& (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\
& (\forall X1.(m1\_modcat\_1 X1 X0) \Rightarrow (\forall X2.(m4\_modcat\_1 X2 X0 \\
& (k4\_modcat\_1 X0 X1) \Rightarrow (\forall X3.(m4\_modcat\_1 X3 X0 (k4\_modcat\_1 \\
& X0 X1) \Rightarrow ((k5\_modcat\_1 X0 X1 X2 = k6\_modcat\_1 X0 X1 X3) \Rightarrow (k8\_mod\_2 \\
& X0 X2 X3 \in k4\_modcat\_1 X0 X1))))))
\end{aligned}$$