

## t1\_lopban\_4

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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  $v5\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v6\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v7\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v8\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v3\_normsp\_0 : \iota \Rightarrow o$  be given. Let  $v4\_normsp\_0 : \iota \Rightarrow o$  be given. Let  $v2\_normsp\_1 : \iota \Rightarrow o$  be given. Let  $v2\_funcsdom : \iota \Rightarrow o$  be given. Let  $v3\_group\_1 : \iota \Rightarrow o$  be given. Let  $v1\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $v3\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $v5\_lopban\_2 : \iota \Rightarrow o$  be given. Let  $l1\_lopban\_2 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_numbers : \iota$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v3\_normsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_normsp\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_normsp\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k1\_numbers : \iota$  be given. Let  $k3\_rlvect\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_algstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_rlvect\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $k6\_numbers : \iota$  be given. Let  $k1\_real\_1 : \iota \Rightarrow \iota$  be given. Let  $k4\_algstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k7\_real\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_real\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_algstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_normsp\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k18\_complex1 : \iota \Rightarrow \iota$  be given. Let  $r1\_xxreal\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_lopban\_1 : \iota \Rightarrow o$  be given. Let  $l1\_normsp\_1 : \iota \Rightarrow o$  be given. Let  $l2\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $v2\_xxreal\_0 : \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $l1\_funcsdom : \iota \Rightarrow o$  be given. Let  $l6\_algstr\_0 : \iota \Rightarrow o$  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 ((v5\_rlvect\_1 X0) \wedge \\
& ((v6\_rlvect\_1 X0) \wedge ((v7\_rlvect\_1 X0) \wedge ((v8\_rlvect\_1 X0) \wedge ((v3\_normsp\_0 \\
& X0) \wedge ((v4\_normsp\_0 X0) \wedge ((v2\_normsp\_1 X0) \wedge ((v2\_funcsdom X0) \wedge \\
& ((v3\_group\_1 X0) \wedge ((v1\_vectsp\_1 X0) \wedge ((v3\_vectsp\_1 X0) \wedge ((v5\_lopban\_2 \\
& X0) \wedge (l1\_lopban\_2 X0)))))))))))))) \Rightarrow (\forall X1.(m1\_subset\_1 \\
& X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4. \\
& (m1\_subset\_1 X4 k1\_numbers) \Rightarrow (\forall X5.(m1\_subset\_1 X5 k1\_numbers) \Rightarrow \\
& ((k3\_rlvect\_1 X0 X1 X2 = k3\_rlvect\_1 X0 X2 X1) \wedge ((k3\_rlvect\_1 X0 ( \\
& k3\_rlvect\_1 X0 X1 X2) X3 = k3\_rlvect\_1 X0 X1 (k3\_rlvect\_1 X0 X2 X3)) \wedge \\
& ((k3\_rlvect\_1 X0 X1 (k4\_struct\_0 X0) = X1) \wedge ((\exists X6.(m1\_subset\_1 \\
& X6 (u1\_struct\_0 X0)) \wedge (k3\_rlvect\_1 X0 X1 X6 = k4\_struct\_0 X0)) \wedge \\
& (k6\_algstr\_0 X0 (k6\_algstr\_0 X0 X1 X2) X3 = k6\_algstr\_0 X0 X1 (k6\_algstr\_0 \\
& X0 X2 X3)) \wedge ((k1\_rlvect\_1 X0 X1 np\_1 = X1) \wedge ((k1\_rlvect\_1 X0 X1 k6\_numbers = \\
& k4\_struct\_0 X0) \wedge ((k1\_rlvect\_1 X0 (k4\_struct\_0 X0) X4 = k4\_struct\_0 \\
& X0) \wedge ((k1\_rlvect\_1 X0 X1 (k1\_real\_1 np\_1) = k4\_algstr\_0 X0 X1) \wedge \\
& ((k6\_algstr\_0 X0 X1 (k5\_struct\_0 X0) = X1) \wedge ((k6\_algstr\_0 X0 (k5\_struct\_0 \\
& X0) X1 = X1) \wedge ((k6\_algstr\_0 X0 X1 (k3\_rlvect\_1 X0 X2 X3) = k3\_rlvect\_1 \\
& X0 (k6\_algstr\_0 X0 X1 X2) (k6\_algstr\_0 X0 X1 X3)) \wedge ((k6\_algstr\_0 \\
& X0 (k3\_rlvect\_1 X0 X2 X3) X1 = k3\_rlvect\_1 X0 (k6\_algstr\_0 X0 X2 X1) \\
& (k6\_algstr\_0 X0 X3 X1)) \wedge ((k1\_rlvect\_1 X0 (k6\_algstr\_0 X0 X1 X2) \\
& X4 = k6\_algstr\_0 X0 (k1\_rlvect\_1 X0 X1 X4) X2) \wedge ((k1\_rlvect\_1 X0 ( \\
& k3\_rlvect\_1 X0 X1 X2) X4 = k3\_rlvect\_1 X0 (k1\_rlvect\_1 X0 X1 X4) (k1\_rlvect\_1 \\
& X0 X2 X4)) \wedge ((k1\_rlvect\_1 X0 X1 (k7\_real\_1 X4 X5) = k3\_rlvect\_1 X0 \\
& (k1\_rlvect\_1 X0 X1 X4) (k1\_rlvect\_1 X0 X1 X5)) \wedge ((k1\_rlvect\_1 X0 \\
& X1 (k8\_real\_1 X4 X5) = k1\_rlvect\_1 X0 (k1\_rlvect\_1 X0 X1 X5) X4) \wedge \\
& ((k1\_rlvect\_1 X0 (k6\_algstr\_0 X0 X1 X2) (k8\_real\_1 X4 X5) = k6\_algstr\_0 \\
& X0 (k1\_rlvect\_1 X0 X1 X4) (k1\_rlvect\_1 X0 X2 X5)) \wedge ((k1\_rlvect\_1 \\
& X0 (k6\_algstr\_0 X0 X1 X2) X4 = k6\_algstr\_0 X0 X1 (k1\_rlvect\_1 X0 X2 \\
& X4)) \wedge ((k6\_algstr\_0 X0 (k4\_struct\_0 X0) X1 = k4\_struct\_0 X0) \wedge (( \\
& k6\_algstr\_0 X0 X1 (k4\_struct\_0 X0) = k4\_struct\_0 X0) \wedge ((k6\_algstr\_0 \\
& X0 X1 (k5\_algstr\_0 X0 X2 X3) = k5\_algstr\_0 X0 (k6\_algstr\_0 X0 X1 X2) \\
& (k6\_algstr\_0 X0 X1 X3)) \wedge ((k6\_algstr\_0 X0 (k5\_algstr\_0 X0 X2 X3) \\
& X1 = k5\_algstr\_0 X0 (k6\_algstr\_0 X0 X2 X1) (k6\_algstr\_0 X0 X3 X1)) \wedge \\
& ((k5\_algstr\_0 X0 (k3\_rlvect\_1 X0 X1 X2) X3 = k3\_rlvect\_1 X0 X1 (k5\_algstr\_0 \\
& X0 X2 X3)) \wedge ((k3\_rlvect\_1 X0 (k5\_algstr\_0 X0 X1 X2) X3 = k5\_algstr\_0 \\
& X0 X1 (k5\_algstr\_0 X0 X2 X3)) \wedge ((k5\_algstr\_0 X0 (k5\_algstr\_0 X0 X1 \\
& X2) X3 = k5\_algstr\_0 X0 X1 (k3\_rlvect\_1 X0 X2 X3)) \wedge ((k3\_rlvect\_1 \\
& X0 X1 X2 = k3\_rlvect\_1 X0 (k5\_algstr\_0 X0 X1 X3) (k3\_rlvect\_1 X0 X3 \\
& X2)) \wedge ((k5\_algstr\_0 X0 X1 X2 = k3\_rlvect\_1 X0 (k5\_algstr\_0 X0 X1 X3) \\
& (k5\_algstr\_0 X0 X3 X2)) \wedge ((X1 = k3\_rlvect\_1 X0 (k5\_algstr\_0 X0 X1 \\
& X2) X2) \wedge ((X1 = k5\_algstr\_0 X0 X2 (k5\_algstr\_0 X0 X2 X1)) \wedge ((k1\_normsp\_0 \\
& X0 X1 = k6\_numbers) \Rightarrow (X1 = k4\_struct\_0 X0)) \wedge ((X1 = k4\_struct\_0 X0) \Rightarrow \\
& (k1\_normsp\_0 X0 X1 = k6\_numbers)) \wedge ((k1\_normsp\_0 X0 (k1\_rlvect\_1 \\
& X0 X1 X4) = k8\_real\_1 (k18\_complex1 X4) (k1\_normsp\_0 X0 X1)) \wedge ((r1\_xreal\_0 \\
& (k1\_normsp\_0 X0 (k3\_rlvect\_1 X0 X1 X2)) (k7\_real\_1 (k1\_normsp\_0 \\
& X0 X1) (k1\_normsp\_0 X0 X2))) \wedge ((r1\_xreal\_0 (k1\_normsp\_0 X0 (k6\_algstr\_0 \\
& X0 X1 X2)) (k8\_real\_1 (k1\_normsp\_0 X0 X1) (k1\_normsp\_0 X0 X2))) \wedge \\
& ((k1\_normsp\_0 X0 (k5\_struct\_0 X0) = np\_1) \wedge (v3\_lopban\_1 X0))))))))))))))))))
\end{aligned}$$

(1)

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\
& X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v5\_rlvect\_1 X0) \wedge \\
& ((v6\_rlvect\_1 X0) \wedge ((v7\_rlvect\_1 X0) \wedge ((v8\_rlvect\_1 X0) \wedge ((v3\_normsp\_0 \\
& X0) \wedge ((v4\_normsp\_0 X0) \wedge ((v2\_normsp\_1 X0) \wedge (l1\_normsp\_1 X0)))))))))) \Rightarrow \\
& (\forall X1.((v1\_funct\_1 X1) \wedge ((v1\_funct\_2 X1 k5\_numbers (u1\_struct\_0 \\
& X0)) \wedge (m1\_subset\_1 X1 (k1\_zfmisc\_1 (k2\_zfmisc\_1 k5\_numbers (u1\_struct\_0 \\
& X0)))))) \Rightarrow (\forall X2.((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 k5\_numbers \\
& (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& k5\_numbers (u1\_struct\_0 X0)))))) \Rightarrow (((v3\_normsp\_1 X1 X0) \wedge (v3\_normsp\_1 \\
& X2 X0)) \Rightarrow (k6\_normsp\_1 X0 (k3\_normsp\_1 X0 X1 X2) = k5\_algstr\_0 X0 ( \\
& k6\_normsp\_1 X0 X1) (k6\_normsp\_1 X0 X2))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_rlvect\_1 \\
& X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))) \Rightarrow (\forall X1.(m1\_subset\_1 \\
& X1 (u1\_struct\_0 X0)) \Rightarrow (k5\_algstr\_0 X0 X1 (k4\_struct\_0 X0) = X1))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& ((v2\_xxreal\_0 np\_1) \wedge (m2\_subset\_1 np\_1 k1\_numbers k5\_numbers)) \wedge \\
& ((m1\_subset\_1 np\_1 k5\_numbers) \wedge (m1\_subset\_1 np\_1 k1\_numbers))
\end{aligned} \tag{4}$$

Assume the following.

$$\forall X0.(l1\_rlvect\_1 X0) \Rightarrow (l2\_algstr\_0 X0) \tag{5}$$

Assume the following.

$$\forall X0.(l1\_lopban\_2 X0) \Rightarrow ((l1\_funcsdom X0) \wedge (l1\_normsp\_1 X0)) \tag{6}$$

Assume the following.

$$\forall X0.(l1\_funcsdom X0) \Rightarrow ((l6\_algstr\_0 X0) \wedge (l1\_rlvect\_1 X0)) \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge \\
& ((v2\_rlvect\_1 X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v5\_rlvect\_1 \\
& X0) \wedge ((v6\_rlvect\_1 X0) \wedge ((v7\_rlvect\_1 X0) \wedge ((v8\_rlvect\_1 X0) \wedge \\
& ((v3\_normsp\_0 X0) \wedge ((v4\_normsp\_0 X0) \wedge ((v2\_normsp\_1 X0) \wedge (l1\_normsp\_1 \\
& X0)))))))))) \wedge ((v1\_funct\_1 X1) \wedge ((v1\_funct\_2 X1 k5\_numbers \\
& (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X1 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& k5\_numbers (u1\_struct\_0 X0)))))) \Rightarrow (m1\_subset\_1 (k6\_normsp\_1 \\
& X0 X1) (u1\_struct\_0 X0))
\end{aligned} \tag{8}$$

**Theorem 1**

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge (v13\_algstr\_0 X0) \wedge (v2\_rlvect\_1 \\ & X0) \wedge (v3\_rlvect\_1 X0) \wedge (v4\_rlvect\_1 X0) \wedge (v5\_rlvect\_1 X0) \wedge \\ & (v6\_rlvect\_1 X0) \wedge (v7\_rlvect\_1 X0) \wedge (v8\_rlvect\_1 X0) \wedge (v3\_normsp\_0 \\ & X0) \wedge (v4\_normsp\_0 X0) \wedge (v2\_normsp\_1 X0) \wedge (v2\_funcsdom X0) \wedge \\ & (v3\_group\_1 X0) \wedge (v1\_vectsp\_1 X0) \wedge (v3\_vectsp\_1 X0) \wedge (v5\_lopban\_2 \\ & X0) \wedge (l1\_lopban\_2 X0)))))) \Rightarrow (\forall X1. ((v1\_funct\_1 \\ & X1) \wedge (v1\_funct\_2 X1 k5\_numbers (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 \\ & X1 (k1\_zfmisc\_1 (k2\_zfmisc\_1 k5\_numbers (u1\_struct\_0 X0)))))) \Rightarrow \\ & (\forall X2. ((v1\_funct\_1 X2) \wedge (v1\_funct\_2 X2 k5\_numbers (u1\_struct\_0 \\ & X0)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 k5\_numbers (u1\_struct\_0 \\ & X0)))))) \Rightarrow (((v3\_normsp\_1 X1 X0) \wedge (v3\_normsp\_1 X2 X0) \wedge (k6\_normsp\_1 \\ & X0 (k3\_normsp\_1 X0 X1 X2) = k4\_struct\_0 X0)) \Rightarrow (k6\_normsp\_1 X0 X1 = \\ & k6\_normsp\_1 X0 X2)))) \end{aligned}$$