

t41_mod_4 (TMYFKH-
PHMz26zvtJKaJ8ogNh1xEMg1HAqS5)

October 27, 2020

Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $v13_algstr_0 : \iota \Rightarrow o$ 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 $v2_rlvect_1 : \iota \Rightarrow o$ be given. Let $v3_rlvect_1 : \iota \Rightarrow o$ be given. Let $v4_rlvect_1 : \iota \Rightarrow o$ be given. Let $l6_algstr_0 : \iota \Rightarrow o$ 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 $u1_struct_0 : \iota \Rightarrow \iota$ 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 $v8_vectsp_1 : \iota \Rightarrow \iota \Rightarrow o$ 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 $m1_mod_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k6_grcat_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k3_funct_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k4_vectsp_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k3_rlvect_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l2_algstr_0 : \iota \Rightarrow o$ be given. Let $l5_algstr_0 : \iota \Rightarrow o$ be given. Let $l2_struct_0 : \iota \Rightarrow o$ be given. Let $l1_algstr_0 : \iota \Rightarrow o$

be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((v13_algstr_0 X0) \wedge ((v3_group_1 X0) \wedge ((v4_vectsp_1 X0) \wedge ((v5_vectsp_1 X0) \wedge ((v2_rlvect_1 X0) \wedge ((v3_rlvect_1 X0) \wedge ((v4_rlvect_1 X0) \wedge (l6_algstr_0 X0)))))))))) \Rightarrow \\
& (\forall X1.((\neg v2_struct_0 X1) \wedge ((v13_algstr_0 X1) \wedge ((v3_group_1 X1) \wedge ((v4_vectsp_1 X1) \wedge ((v5_vectsp_1 X1) \wedge ((v2_rlvect_1 X1) \wedge ((v3_rlvect_1 X1) \wedge ((v4_rlvect_1 X1) \wedge (l6_algstr_0 X1)))))))))) \Rightarrow \\
& (\forall X2.((v1_funct_1 X2) \wedge ((v1_funct_2 X2 (u1_struct_0 X1) (u1_struct_0 X0)) \wedge (m1_subset_1 X2 (k1_zfmisc_1 (k2_zfmisc_1 (u1_struct_0 X1) (u1_struct_0 X0)))))) \Rightarrow (\forall X3.((\neg v2_struct_0 X3) \wedge ((v13_algstr_0 X3) \wedge ((v8_vectsp_1 X3 X1) \wedge ((v9_vectsp_1 X3 X1) \wedge ((v10_vectsp_1 X3 X1) \wedge ((v11_vectsp_1 X3 X1) \wedge ((v2_rlvect_1 X3) \wedge ((v3_rlvect_1 X3) \wedge ((v4_rlvect_1 X3) \wedge (l1_vectsp_1 X3 X1)))))))))) \Rightarrow \\
& (\forall X4.((\neg v2_struct_0 X4) \wedge ((v13_algstr_0 X4) \wedge ((v8_vectsp_1 X4 X0) \wedge ((v9_vectsp_1 X4 X0) \wedge ((v10_vectsp_1 X4 X0) \wedge ((v11_vectsp_1 X4 X0) \wedge ((v2_rlvect_1 X4) \wedge ((v3_rlvect_1 X4) \wedge ((v4_rlvect_1 X4) \wedge (l1_vectsp_1 X4 X0)))))))))) \Rightarrow (\forall X5.(m1_subset_1 X5 (u1_struct_0 X1)) \Rightarrow (\forall X6.(m1_subset_1 X6 (u1_struct_0 X3)) \Rightarrow (k3_funct_2 (u1_struct_0 X3) (u1_struct_0 X4) (k6_grcat_1 X3 X4) (k4_vectsp_1 X1 X3 X5 X6) = k4_vectsp_1 X0 X4 (k3_funct_2 (u1_struct_0 X1) (u1_struct_0 X0) X2 X5) (k3_funct_2 (u1_struct_0 X3) (u1_struct_0 X4) (k6_grcat_1 X3 X4) X6)))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((v13_algstr_0 X0) \wedge ((v3_group_1 X0) \wedge ((v4_vectsp_1 X0) \wedge ((v5_vectsp_1 X0) \wedge ((v2_rlvect_1 X0) \wedge ((v3_rlvect_1 X0) \wedge ((v4_rlvect_1 X0) \wedge (l6_algstr_0 X0)))))))))) \Rightarrow \\
& (\forall X1.((\neg v2_struct_0 X1) \wedge ((v13_algstr_0 X1) \wedge ((v3_group_1 X1) \wedge ((v4_vectsp_1 X1) \wedge ((v5_vectsp_1 X1) \wedge ((v2_rlvect_1 X1) \wedge ((v3_rlvect_1 X1) \wedge ((v4_rlvect_1 X1) \wedge (l6_algstr_0 X1)))))))))) \Rightarrow \\
& (\forall X2.((\neg v2_struct_0 X2) \wedge ((v13_algstr_0 X2) \wedge ((v8_vectsp_1 X2 X0) \wedge ((v9_vectsp_1 X2 X0) \wedge ((v10_vectsp_1 X2 X0) \wedge ((v11_vectsp_1 X2 X0) \wedge ((v2_rlvect_1 X2) \wedge ((v3_rlvect_1 X2) \wedge ((v4_rlvect_1 X2) \wedge (l1_vectsp_1 X2 X0)))))))))) \Rightarrow (\forall X3.((\neg v2_struct_0 X3) \wedge ((v13_algstr_0 X3) \wedge ((v8_vectsp_1 X3 X1) \wedge ((v9_vectsp_1 X3 X1) \wedge ((v10_vectsp_1 X3 X1) \wedge ((v11_vectsp_1 X3 X1) \wedge ((v2_rlvect_1 X3) \wedge ((v3_rlvect_1 X3) \wedge ((v4_rlvect_1 X3) \wedge (l1_vectsp_1 X3 X1)))))))))) \Rightarrow \\
& (\forall X4.(m1_subset_1 X4 (u1_struct_0 X2)) \Rightarrow (\forall X5.(m1_subset_1 X5 (u1_struct_0 X2)) \Rightarrow (k3_funct_2 (u1_struct_0 X2) (u1_struct_0 X3) (k6_grcat_1 X2 X3) (k3_rlvect_1 X2 X4 X5) = k3_rlvect_1 X3 (k3_funct_2 (u1_struct_0 X2) (u1_struct_0 X3) (k6_grcat_1 X2 X3) X4) (k3_funct_2 (u1_struct_0 X2) (u1_struct_0 X3) (k6_grcat_1 X2 X3) X5)))))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\forall X0.(l6_algstr_0 X0) \Rightarrow ((l2_algstr_0 X0) \wedge (l5_algstr_0 X0)) \quad (3)$$

Assume the following.

$$\forall X0.(l2_algstr_0 X0) \Rightarrow ((l2_struct_0 X0) \wedge (l1_algstr_0 X0)) \quad (4)$$

Assume the following.

$$\forall X0.(l1_struct_0 X0) \Rightarrow (\forall X1.(l1_vectsp_1 X1 X0) \Rightarrow (l2_algstr_0 X1)) \quad (5)$$

Assume the following.

$$\forall X0.(l1_algstr_0 X0) \Rightarrow (l1_struct_0 X0) \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.(((\neg v2_struct_0 X0) \wedge (l1_struct_0 X0)) \wedge \\ & ((\neg v2_struct_0 X1) \wedge (l2_struct_0 X1))) \Rightarrow ((v1_funct_1 (k6_grcat_1 \\ & X0 X1)) \wedge ((v1_funct_2 (k6_grcat_1 X0 X1) (u1_struct_0 X0) (u1_struct_0 \\ & X1)) \wedge (m1_subset_1 (k6_grcat_1 X0 X1) (k1_zfmisc_1 (k2_zfmisc_1 \\ & (u1_struct_0 X0) (u1_struct_0 X1)))))) \end{aligned} \quad (7)$$

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 ((v3_group_1 \\
& X1) \wedge ((v4_vectsp_1 X1) \wedge ((v5_vectsp_1 X1) \wedge ((v2_rlvect_1 X1) \wedge \\
& ((v3_rlvect_1 X1) \wedge ((v4_rlvect_1 X1) \wedge (l6_algstr_0 X1)))))))) \Rightarrow \\
& (\forall X2.((v1_funct_1 X2) \wedge ((v1_funct_2 X2 (u1_struct_0 X0) \\
& (u1_struct_0 X1)) \wedge (m1_subset_1 X2 (k1_zfmisc_1 (k2_zfmisc_1 \\
& (u1_struct_0 X0) (u1_struct_0 X1)))))) \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.((\neg v2_struct_0 X4) \wedge ((v13_algstr_0 X4) \wedge ((v8_vectsp_1 \\
& X4 X1) \wedge ((v9_vectsp_1 X4 X1) \wedge ((v10_vectsp_1 X4 X1) \wedge ((v11_vectsp_1 \\
& X4 X1) \wedge ((v2_rlvect_1 X4) \wedge ((v3_rlvect_1 X4) \wedge ((v4_rlvect_1 X4) \wedge \\
& (l1_vectsp_1 X4 X1)))))))))) \Rightarrow (\forall X5.((v1_funct_1 X5) \wedge (\\
& (v1_funct_2 X5 (u1_struct_0 X3) (u1_struct_0 X4)) \wedge (m1_subset_1 \\
& X5 (k1_zfmisc_1 (k2_zfmisc_1 (u1_struct_0 X3) (u1_struct_0 X4)))))) \Rightarrow \\
& ((m1_mod_4 X5 X0 X1 X2 X3 X4) \Leftrightarrow ((\forall X6.(m1_subset_1 X6 (u1_struct_0 \\
& X3)) \Rightarrow (\forall X7.(m1_subset_1 X7 (u1_struct_0 X3)) \Rightarrow (k3_funct_2 \\
& (u1_struct_0 X3) (u1_struct_0 X4) X5 (k3_rlvect_1 X3 X6 X7) = k3_rlvect_1 \\
& X4 (k3_funct_2 (u1_struct_0 X3) (u1_struct_0 X4) X5 X6) (k3_funct_2 \\
& (u1_struct_0 X3) (u1_struct_0 X4) X5 X7)))) \wedge (\forall X6.(m1_subset_1 \\
& X6 (u1_struct_0 X0)) \Rightarrow (\forall X7.(m1_subset_1 X7 (u1_struct_0 \\
& X3)) \Rightarrow (k3_funct_2 (u1_struct_0 X3) (u1_struct_0 X4) X5 (k4_vectsp_1 \\
& X0 X3 X6 X7) = k4_vectsp_1 X1 X4 (k3_funct_2 (u1_struct_0 X0) (u1_struct_0 \\
& X1) X2 X6) (k3_funct_2 (u1_struct_0 X3) (u1_struct_0 X4) X5 X7))))))))) \\
& \tag{8}
\end{aligned}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((v13_algstr_0 X0) \wedge ((v3_group_1 \\
& X0) \wedge ((v4_vectsp_1 X0) \wedge ((v5_vectsp_1 X0) \wedge ((v2_rlvect_1 X0) \wedge \\
& ((v3_rlvect_1 X0) \wedge ((v4_rlvect_1 X0) \wedge (l6_algstr_0 X0)))))))))) \Rightarrow \\
& (\forall X1.((\neg v2_struct_0 X1) \wedge ((v13_algstr_0 X1) \wedge ((v3_group_1 \\
& X1) \wedge ((v4_vectsp_1 X1) \wedge ((v5_vectsp_1 X1) \wedge ((v2_rlvect_1 X1) \wedge \\
& ((v3_rlvect_1 X1) \wedge ((v4_rlvect_1 X1) \wedge (l6_algstr_0 X1)))))))))) \Rightarrow \\
& (\forall X2.((v1_funct_1 X2) \wedge ((v1_funct_2 X2 (u1_struct_0 X0) \\
& (u1_struct_0 X1)) \wedge (m1_subset_1 X2 (k1_zfmisc_1 (k2_zfmisc_1 \\
& (u1_struct_0 X0) (u1_struct_0 X1)))))) \Rightarrow (\forall X3.((\neg v2_struct_0 \\
& X3) \wedge ((v13_algstr_0 X3) \wedge ((v8_vectsp_1 X3 X0) \wedge ((v9_vectsp_1 X3 \\
& X0) \wedge ((v10_vectsp_1 X3 X0) \wedge ((v11_vectsp_1 X3 X0) \wedge ((v2_rlvect_1 \\
& X3) \wedge ((v3_rlvect_1 X3) \wedge ((v4_rlvect_1 X3) \wedge (l1_vectsp_1 X3 X0)))))))))) \Rightarrow \\
& (\forall X4.((\neg v2_struct_0 X4) \wedge ((v13_algstr_0 X4) \wedge ((v8_vectsp_1 \\
& X4 X1) \wedge ((v9_vectsp_1 X4 X1) \wedge ((v10_vectsp_1 X4 X1) \wedge ((v11_vectsp_1 \\
& X4 X1) \wedge ((v2_rlvect_1 X4) \wedge ((v3_rlvect_1 X4) \wedge ((v4_rlvect_1 X4) \wedge \\
& (l1_vectsp_1 X4 X1)))))))))) \Rightarrow (m1_mod_4 (k6_gcat_1 X3 X4) X0 X1 \\
& X2 X3 X4))))))
\end{aligned}$$