

thm_2Elist_2EGENLIST__AUX__compute
 (TMbTpoEWd-
 sjdZKt4wRhbHcF5y7JDB9omywW)

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Let $c_2Enum_2EZERO_REP : \iota$ be given. Assume the following.

$$c_2Enum_2EZERO_REP \in \omega \tag{1}$$

Let $ty_2Enum_2Enum : \iota$ be given. Assume the following.

$$nonempty\ ty_2Enum_2Enum \tag{2}$$

Let $c_2Enum_2EABS_num : \iota$ be given. Assume the following.

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \tag{3}$$

Definition 1 We define c_2Emin_2E3D to be $\lambda A. \lambda x \in A. \lambda y \in A. inj_o(x = y)$ of type $\iota \Rightarrow \iota$.

Definition 2 We define c_2Enum_2E0 to be $(ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP)$.

Let $c_2Enum_2EREP_num : \iota$ be given. Assume the following.

$$c_2Enum_2EREP_num \in (\omega^{ty_2Enum_2Enum}) \tag{4}$$

Let $c_2Enum_2ESUC_REP : \iota$ be given. Assume the following.

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \tag{5}$$

Definition 3 We define c_2Ebool_2ET to be $(ap\ (ap\ (c_2Emin_2E3D\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1x))$

Definition 4 We define c_2Ebool_2E21 to be $\lambda A. 27a : \iota. (\lambda V0P \in (2^{A-27a}). (ap\ (ap\ (c_2Emin_2E3D\ (2^{A-27a}))\ (\lambda V1x \in 2.V1x))\ (\lambda V2x \in 2.V2x))$

Definition 5 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum. (ap\ c_2Enum_2EABS_num\ (ap\ c_2Enum_2EREP_num\ (ap\ c_2Enum_2ESUC_REP\ m)))$

Let $c_2Earithmetic_2E2B : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \tag{6}$$

Definition 6 We define `c_2Earithmetic_2EBIT2` to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2EBIT2 V0n))$

Definition 7 We define `c_2Earithmetic_2EZERO` to be `c_2Enum_2E0`.

Let `c_2Earithmetic_2E_2D` : ι be given. Assume the following.

$$c_2Earithmetic_2E_2D \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (7)$$

Definition 8 We define `c_2Earithmetic_2EBIT1` to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2EBIT1 V0n))$

Definition 9 We define `c_2Earithmetic_2ENUMERAL` to be $\lambda V0x \in ty_2Enum_2Enum.V0x$.

Definition 10 We define `c_2Emin_2E_3D_3D_3E` to be $\lambda P \in 2.\lambda Q \in 2.inj_o (p P \Rightarrow p Q)$ of type ι .

Let `ty_2Elist_2Elist` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Elist_2Elist A0) \quad (8)$$

Let `c_2Elist_2ECONS` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2ECONS A_27a \in (((ty_2Elist_2Elist A_27a)^{(ty_2Elist_2Elist A_27a)})^{A_27a}) \quad (9)$$

Let `c_2Elist_2EGENLIST_AUX` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2EGENLIST_AUX A_27a \in (((ty_2Elist_2Elist A_27a)^{(ty_2Elist_2Elist A_27a)})^{ty_2Enum_2Enum})^{(A_27a^{ty_2Enum_2Enum})} \quad (10)$$

Definition 11 We define `c_2Ebool_2E_2F_5C` to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.V2t))))$

Assume the following.

$$\begin{aligned} & \forall A_27a.nonempty A_27a \Rightarrow (\forall V0f \in ((A_27a^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}). \\ & \quad (\forall V1g \in (A_27a^{ty_2Enum_2Enum}).((\forall V2n \in ty_2Enum_2Enum. \\ & \quad ((ap V1g (ap c_2Enum_2ESUC V2n)) = (ap (ap V0f V2n) (ap c_2Enum_2ESUC V2n)))) \Leftrightarrow ((\forall V3n \in ty_2Enum_2Enum.((ap V1g (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT1 V3n))) = (ap (ap V0f (ap (ap c_2Earithmetic_2E_2D \\ & \quad (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V3n)))) \\ & \quad (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V3n)))))) \wedge \\ & \quad (\forall V4n \in ty_2Enum_2Enum.((ap V1g (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT2 V4n))) = (ap (ap V0f (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT1 V4n))) (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT2 V4n)))))))))) \quad (11) \end{aligned}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p V0t1) \Rightarrow (p V1t2)) \Rightarrow (((p V1t2) \Rightarrow (p V0t1)) \Rightarrow ((p V0t1) \Leftrightarrow (p V1t2)))))) \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall A_27a.nonempty\ A_27a \Rightarrow ((\forall V0f \in (A_27a^{ty-2Enum-2Enum}). \\ & (\forall V1l \in (ty_2Elist_2Elist\ A_27a).((ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX \\ & A_27a)\ V0f)\ c_2Enum_2E0)\ V1l) = V1l))) \wedge (\forall V2f \in (A_27a^{ty-2Enum-2Enum}). \\ & (\forall V3n \in ty_2Enum_2Enum.(\forall V4l \in (ty_2Elist_2Elist \\ & A_27a).((ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX\ A_27a)\ V2f)\ (ap\ c_2Enum_2ESUC \\ & V3n))\ V4l) = (ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX\ A_27a)\ V2f)\ V3n) \\ & (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ (ap\ V2f\ V3n))\ V4l))))))) \quad (13) \end{aligned}$$

Theorem 1

$$\begin{aligned} & \forall A_27a.nonempty\ A_27a \Rightarrow ((\forall V0f \in (A_27a^{ty-2Enum-2Enum}). \\ & (\forall V1l \in (ty_2Elist_2Elist\ A_27a).((ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX \\ & A_27a)\ V0f)\ c_2Enum_2E0)\ V1l) = V1l))) \wedge (\forall V2f \in (A_27a^{ty-2Enum-2Enum}). \\ & (\forall V3n \in ty_2Enum_2Enum.(\forall V4l \in (ty_2Elist_2Elist \\ & A_27a).((ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX\ A_27a)\ V2f)\ (ap\ c_2Earithmetic_2ENUMERAL \\ & (ap\ c_2Earithmetic_2EBIT1\ V3n)))\ V4l) = (ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX \\ & A_27a)\ V2f)\ (ap\ (ap\ c_2Earithmetic_2E_2D\ (ap\ c_2Earithmetic_2ENUMERAL \\ & (ap\ c_2Earithmetic_2EBIT1\ V3n)))\ (ap\ c_2Earithmetic_2ENUMERAL \\ & (ap\ c_2Earithmetic_2EBIT1\ c_2Earithmetic_2EZERO))))))\ (ap\ (ap \\ & (c_2Elist_2ECONS\ A_27a)\ (ap\ V2f\ (ap\ (ap\ c_2Earithmetic_2E_2D\ (\\ & ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT1\ V3n)))) \\ & (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT1\ c_2Earithmetic_2EZERO)))))) \\ & V4l)))))) \wedge (\forall V5f \in (A_27a^{ty-2Enum-2Enum}).(\forall V6n \in \\ & ty_2Enum_2Enum.(\forall V7l \in (ty_2Elist_2Elist\ A_27a).((ap \\ & (ap\ (ap\ (c_2Elist_2EGENLIST_AUX\ A_27a)\ V5f)\ (ap\ c_2Earithmetic_2ENUMERAL \\ & (ap\ c_2Earithmetic_2EBIT2\ V6n)))\ V7l) = (ap\ (ap\ (ap\ (c_2Elist_2EGENLIST_AUX \\ & A_27a)\ V5f)\ (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT1 \\ & V6n)))\ (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ (ap\ V5f\ (ap\ c_2Earithmetic_2ENUMERAL \\ & (ap\ c_2Earithmetic_2EBIT1\ V6n))))\ V7l))))))))) \end{aligned}$$