

thm_2Erich__list_2ESEG__SUC__CONS (TM- ZouNg6N1fUsiXmYuhRGdbJT8RyeS6qQVV)

October 26, 2020

Definition 1 We define $c_2Emin_2E_3D$ 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_2Ebool_2ET to be $(ap (ap (c_2Emin_2E_3D (2^2)) (\lambda V0x \in 2.V0x)) (\lambda V1x \in 2.V1x))$

Definition 3 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.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Elist_2Elist A0) \quad (1)$$

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

$$\forall A.27a.nonempty A.27a \Rightarrow c_2Elist_2ECONS A.27a \in (((ty_2Elist_2Elist A.27a)^{(ty_2Elist_2Elist A.27a)})^{A.27a}) \quad (2)$$

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

$$nonempty ty_2Enum_2Enum \quad (3)$$

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

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

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

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

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

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \quad (6)$$

Definition 4 We define $c_2Ebool_2E_21$ to be $\lambda A.27a : \iota.(\lambda V0P \in (2^{A-27a}).(ap (ap (c_2Emin_2E_3D (2^{A-27a}))$

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

Let $c_2Elist_2ENIL : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elist_2ENIL\ A_27a \in (ty_2Elist_2Elist\ A_27a) \quad (7)$$

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

$$c_2Enum_2EZERO_REP \in \omega \quad (8)$$

Definition 6 We define c_2Enum_2E0 to be $(ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP)$.

Let $c_2Erich_list_2ESEG : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Erich_list_2ESEG\ A_27a \in ((ty_2Elist_2Elist\ A_27a)^{(ty_2Elist_2Elist\ A_27a)} ty_2Enum_2Enum)^{ty_2Enum_2Enum} \quad (9)$$

Definition 7 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (c_2Ebool_2E_21\ 2)\ (\lambda V2t \in 2.$

Assume the following.

$$True \quad (10)$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0t \in 2.((\forall V1x \in A_27a.(p\ V0t) \Leftrightarrow (p\ V0t))) \quad (11)$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a.((V0x = V0x) \Leftrightarrow True)) \quad (12)$$

Assume the following.

$$(\forall V0P \in (2^{ty_2Enum_2Enum}).(((p\ (ap\ V0P\ c_2Enum_2E0)) \wedge (\forall V1n \in ty_2Enum_2Enum.((p\ (ap\ V0P\ V1n)) \Rightarrow (p\ (ap\ V0P\ (ap\ c_2Enum_2ESUC\ V1n)))))) \Rightarrow (\forall V2n \in ty_2Enum_2Enum.(p\ (ap\ V0P\ V2n)))))) \quad (13)$$

Assume the following.

$$\begin{aligned} & \forall A_27a.nonempty\ A_27a \Rightarrow ((\forall V0k \in ty_2Enum_2Enum. \\ & (\forall V1l \in (ty_2Elist_2Elist\ A_27a).((ap\ (ap\ (ap\ (c_2Erich_list_2ESEG\ A_27a)\ c_2Enum_2E0)\ V0k)\ V1l) = (c_2Elist_2ENIL\ A_27a)))) \wedge ((\forall V2m \in \\ & ty_2Enum_2Enum.(\forall V3x \in A_27a.(\forall V4l \in (ty_2Elist_2Elist\ A_27a).((ap\ (ap\ (ap\ (c_2Erich_list_2ESEG\ A_27a)\ (ap\ c_2Enum_2ESUC\ V2m))\ c_2Enum_2E0)\ (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ V3x)\ V4l)) = \\ & (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ V3x)\ (ap\ (ap\ (ap\ (c_2Erich_list_2ESEG\ A_27a)\ V2m)\ c_2Enum_2E0)\ V4l)))))) \wedge (\forall V5m \in ty_2Enum_2Enum. \\ & (\forall V6k \in ty_2Enum_2Enum.(\forall V7x \in A_27a.(\forall V8l \in \\ & (ty_2Elist_2Elist\ A_27a).((ap\ (ap\ (ap\ (c_2Erich_list_2ESEG\ A_27a)\ (ap\ c_2Enum_2ESUC\ V5m))\ (ap\ c_2Enum_2ESUC\ V6k))\ (ap\ (ap\ (\\ & c_2Elist_2ECONS\ A_27a)\ V7x)\ V8l)) = (ap\ (ap\ (ap\ (c_2Erich_list_2ESEG\ A_27a)\ (ap\ c_2Enum_2ESUC\ V5m))\ V6k)\ V8l)))))) \quad (14) \end{aligned}$$

Theorem 1

$$\forall A_{27a}. \text{nonempty } A_{27a} \Rightarrow (\forall V0m \in \text{ty_2Enum_2Enum}. (\forall V1n \in \text{ty_2Enum_2Enum}. (\forall V2l \in (\text{ty_2Elist_2Elist } A_{27a}). (\forall V3x \in A_{27a}. ((\text{ap } (\text{ap } (\text{ap } (\text{c_2Erich_list_2ESEG } A_{27a}) V0m) (\text{ap } \text{c_2Enum_2ESUC } V1n)) (\text{ap } (\text{ap } (\text{c_2Elist_2ECONS } A_{27a}) V3x) V2l)) = (\text{ap } (\text{ap } (\text{ap } (\text{c_2Erich_list_2ESEG } A_{27a}) V0m) V1n) V2l)))))))))$$