

thm_2Erich_list_2EAND_EL_FOLDR
(TMaAsh49iyfemnHQ6EpfXfvpfT5mbs75Kdy)

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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 $c_2Ecombin_2EK$ to be $\lambda A_27a : \iota.\lambda A_27b : \iota.(\lambda V0x \in A_27a.(\lambda V1y \in A_27b.V0x))$

Definition 3 We define $c_2Ecombin_2ES$ to be $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda A_27c : \iota.(\lambda V0f \in ((A_27c^{A_27b})^{A_27a}))$

Definition 4 We define $c_2Ecombin_2EI$ to be $\lambda A_27a : \iota.(ap (ap (c_2Ecombin_2ES A_27a (A_27a^{A_27a})) A_27a))$

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 $c_2Elist_2EEVERY : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2EEVERY A_27a \in ((2^{(ty_2Elist_2Elist A_27a)})^{(2^{A_27a})}) \quad (2)$$

Definition 5 We define $c_2Erich_list_2EAND_EL$ to be $(ap (c_2Elist_2EEVERY 2) (c_2Ecombin_2EI 2))$.

Definition 6 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 7 We define $c_2Emin_2E_3D_3D_3E$ to be $\lambda P \in 2.\lambda Q \in 2.inj_o (p \Rightarrow q)$ of type ι .

Definition 8 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 9 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.V2t)))$

Let $c_2Elist_2EFOLDR : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow c_2Elist_2EFOLDR A_27a A_27b \in (((A_27b^{(ty_2Elist_2Elist A_27a)})^{A_27b})^{((A_27b^{A_27b})^{A_27a})}) \quad (3)$$

Assume the following.

$$\forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0x \in A.27a. ((ap\ (c.2Ecombin.2EI\ A.27a)\ V0x) = V0x)) \quad (4)$$

Assume the following.

$$\begin{aligned} \forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0P \in (2^{A.27a}). (\forall V1l \in \\ (ty.2Elist.2Elist\ A.27a). ((p\ (ap\ (ap\ (c.2Elist.2EVERY\ A.27a)\ \\ V0P)\ V1l)) \Leftrightarrow (p\ (ap\ (ap\ (ap\ (c.2Elist.2EFOLDR\ A.27a\ 2)\ (\lambda V2x \in \\ A.27a. (\lambda V3l.27 \in 2. (ap\ (ap\ c.2Ebool.2E.2F.5C\ (ap\ V0P\ V2x)) \\ V3l.27))))\ c.2Ebool.2ET)\ V1l)))))) \end{aligned} \quad (5)$$

Theorem 1

$$\begin{aligned} (\forall V0l \in (ty.2Elist.2Elist\ 2). ((p\ (ap\ c.2Erich_list.2EAND_EL \\ V0l)) \Leftrightarrow (p\ (ap\ (ap\ (ap\ (c.2Elist.2EFOLDR\ 2\ 2)\ c.2Ebool.2E.2F.5C \\ c.2Ebool.2ET)\ V0l)))) \end{aligned}$$