

thm_2Erich__list_2EMEM__FOLDL
(TMWKpQ5dMwAzJSyWt8uNFdZpWu1KPJDXajc)

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

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 $c_2Elist_2ELIST_TO_SET : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2ELIST_TO_SET A_27a \in ((2^{A_27a})^{(ty_2Elist_2Elist A_27a)}) \quad (2)$$

Definition 3 We define c_2Ebool_2EIN to be $\lambda A_27a : \iota.(\lambda V0x \in A_27a.(\lambda V1f \in (2^{A_27a}).(ap V1f V0x)))$

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_2Ebool_2EF to be $(ap (c_2Ebool_2E_21 2)) (\lambda V0t \in 2.V0t)$.

Definition 6 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 .

Definition 7 We define $c_2Ebool_2E_5C_2F$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2)) (\lambda V2t \in 2.V2t)))$

Let $c_2Elist_2EFOLDL : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow c_2Elist_2EFOLDL A_27a A_27b \in (((A_27b)^{(ty_2Elist_2Elist A_27a)})^{A_27b})^{((A_27b)^{A_27a})^{A_27b}} \quad (3)$$

Let $c_2Elist_2EEXISTS : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2EEXISTS A_27a \in ((2^{(ty_2Elist_2Elist A_27a)})^{(2^{A_27a})}) \quad (4)$$

Assume the following.

$$True \quad (5)$$

Assume the following.

$$\forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0t \in 2. ((\forall V1x \in A.27a.(p\ V0t)) \Leftrightarrow (p\ V0t))) \quad (6)$$

Assume the following.

$$\forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0x \in A.27a. ((V0x = V0x) \Leftrightarrow True)) \quad (7)$$

Assume the following.

$$\begin{aligned} \forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0x \in A.27a. (\forall V1l \in \\ (ty_2Elist_2Elist\ A.27a). ((p\ (ap\ (ap\ (c.2Ebool_2EIN\ A.27a)\ V0x) \\ (ap\ (c.2Elist_2ELIST_TO_SET\ A.27a)\ V1l)))) \Leftrightarrow (p\ (ap\ (ap\ (c.2Elist_2EEXISTS \\ A.27a)\ (ap\ (c.2Emin_2E_3D\ A.27a)\ V0x))\ V1l)))))) \quad (8) \end{aligned}$$

Assume the following.

$$\begin{aligned} \forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0P \in (2^{A.27a}). (\forall V1l \in \\ (ty_2Elist_2Elist\ A.27a). ((p\ (ap\ (ap\ (c.2Elist_2EEXISTS\ A.27a) \\ V0P)\ V1l)) \Leftrightarrow (p\ (ap\ (ap\ (ap\ (c.2Elist_2EFOLDL\ A.27a\ 2)\ (\lambda V2l.27 \in \\ 2. (\lambda V3x \in A.27a. (ap\ (ap\ c.2Ebool_2E_5C_2F\ V2l.27)\ (ap\ V0P\ V3x)))))) \\ c.2Ebool_2EF)\ V1l)))))) \quad (9) \end{aligned}$$

Theorem 1

$$\begin{aligned} \forall A.27a.nonempty\ A.27a \Rightarrow (\forall V0y \in A.27a. (\forall V1l \in \\ (ty_2Elist_2Elist\ A.27a). ((p\ (ap\ (ap\ (c.2Ebool_2EIN\ A.27a)\ V0y) \\ (ap\ (c.2Elist_2ELIST_TO_SET\ A.27a)\ V1l)))) \Leftrightarrow (p\ (ap\ (ap\ (ap\ (c.2Elist_2EFOLDL \\ A.27a\ 2)\ (\lambda V2l.27 \in 2. (\lambda V3x \in A.27a. (ap\ (ap\ c.2Ebool_2E_5C_2F \\ V2l.27)\ (ap\ (ap\ (c.2Emin_2E_3D\ A.27a)\ V0y)\ V3x))))))\ c.2Ebool_2EF) \\ V1l)))))) \end{aligned}$$