

# thm\_2Erich\_list\_2EFOLDL\_REVERSE (TM- drMwZZQDpAVZBpGoB6zRKfuGbVgcJ1ecL)

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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  $c\_2Elist\_2EREVERSE : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.nonempty A\_27a \Rightarrow c\_2Elist\_2EREVERSE A\_27a \in ((ty\_2Elist\_2Elist A\_27a)^{(ty\_2Elist\_2Elist A\_27a)}) \quad (2)$$

Let  $c\_2Elist\_2EFOLDR : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.nonempty A\_27a \Rightarrow \forall A\_27b.nonempty A\_27b \Rightarrow c\_2Elist\_2EFOLDR A\_27a A\_27b \in (((A\_27b)^{(ty\_2Elist\_2Elist A\_27a)})^{A\_27b})^{((A\_27b)^{A\_27b})^{A\_27a}} \quad (3)$$

Let  $c\_2Elist\_2EFOLDL : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.nonempty A\_27a \Rightarrow \forall A\_27b.nonempty A\_27b \Rightarrow c\_2Elist\_2EFOLDL A\_27a A\_27b \in (((A\_27b)^{(ty\_2Elist\_2Elist A\_27a)})^{A\_27b})^{((A\_27b)^{A\_27a})^{A\_27b}} \quad (4)$$

**Definition 3** We define  $c\_2Ebool\_2E\_21$  to be  $\lambda A\_27a : \iota. (\lambda V0P \in (2^{A\_27a}). (ap (ap (c\_2Emin\_2E\_3D (2^{A\_27a})))$

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.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0l \in (ty\_2Elist\_2Elist\ A\_27a). ((ap\ (c\_2Elist\_2EREVERSE\ A\_27a)\ (ap\ (c\_2Elist\_2EREVERSE\ A\_27a)\ V0l)) = V0l)) \quad (8)$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow \forall A\_27b.nonempty\ A\_27b \Rightarrow (\forall V0f \in ((A\_27a^{A\_27b})^{A\_27a}). (\forall V1e \in A\_27a. (\forall V2l \in (ty\_2Elist\_2Elist\ A\_27b). ((ap\ (ap\ (ap\ (c\_2Elist\_2EFOLDL\ A\_27b\ A\_27a)\ V0f)\ V1e)\ V2l) = (ap\ (ap\ (ap\ (c\_2Elist\_2EFOLDR\ A\_27b\ A\_27a)\ (\lambda V3x \in A\_27b. (\lambda V4y \in A\_27a. (ap\ (ap\ V0f\ V4y)\ V3x))))\ V1e)\ (ap\ (c\_2Elist\_2EREVERSE\ A\_27b)\ V2l))))))) \quad (9)$$

**Theorem 1**

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow \forall A\_27b.nonempty\ A\_27b \Rightarrow (\forall V0f \in ((A\_27a^{A\_27b})^{A\_27a}). (\forall V1e \in A\_27a. (\forall V2l \in (ty\_2Elist\_2Elist\ A\_27b). ((ap\ (ap\ (ap\ (c\_2Elist\_2EFOLDL\ A\_27b\ A\_27a)\ V0f)\ V1e)\ (ap\ (c\_2Elist\_2EREVERSE\ A\_27b)\ V2l)) = (ap\ (ap\ (ap\ (c\_2Elist\_2EFOLDR\ A\_27b\ A\_27a)\ (\lambda V3x \in A\_27b. (\lambda V4y \in A\_27a. (ap\ (ap\ V0f\ V4y)\ V3x))))\ V1e)\ V2l)))))))$$