

thm_2Ecombin_2EGEN_LET_RATOR
(TMUMKiQGwvJBtTgytPDDWpTMnEJdntP-
bvsJ)

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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_2ELET to be $\lambda A_27a : \iota.\lambda A_27b : \iota.(\lambda V0f \in (A_27b^{A_27a}).(\lambda V1x \in A_27a$

Definition 3 We define c_2Ebool_2EET to be $(ap (ap (c_2Emin_2E_3D (2^2)) (\lambda V0x \in 2.V0x)) (\lambda V1x \in 2.V$

Definition 4 We define $c_2Ecombin_2EC$ to be $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda A_27c : \iota.(\lambda V0f \in ((A_27c^{A_27b})^{A_27a})$

Definition 5 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.

$$True \tag{1}$$

Assume the following.

$$\begin{aligned} \forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow (\\ \forall V0f \in (A_27b^{A_27a}).(\forall V1x \in A_27a.((ap (ap (c_2Ebool_2ELET \\ A_27a A_27b) V0f) V1x) = (ap V0f V1x)))) \end{aligned} \tag{2}$$

Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow (\forall V0x \in A_27a.((V0x = V0x) \Leftrightarrow True)) \tag{3}$$

Assume the following.

$$\begin{aligned} \forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow \forall A_27c. \\ nonempty A_27c \Rightarrow (\forall V0f \in ((A_27c^{A_27b})^{A_27a}).(\forall V1x \in \\ A_27b.(\forall V2y \in A_27a.((ap (ap (ap (c_2Ecombin_2EC A_27a A_27b \\ A_27c) V0f) V1x) V2y) = (ap (ap V0f V2y) V1x)))))) \end{aligned} \tag{4}$$

Theorem 1

$$\begin{aligned} & \forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow \forall A_27c. \\ & \quad nonempty\ A_27c \Rightarrow (\forall V0f \in ((A_27a^{A_27c})^{A_27b}). (\forall V1v \in \\ & \quad A_27b. (\forall V2x \in A_27c. ((ap\ (ap\ (ap\ (c_2Ebool_2ELET\ A_27b\ (\\ & \quad A_27a^{A_27c}))\ V0f)\ V1v)\ V2x) = (ap\ (ap\ (c_2Ebool_2ELET\ A_27b\ A_27a) \\ & \quad (ap\ (ap\ (c_2Ecombin_2EC\ A_27b\ A_27c\ A_27a)\ V0f)\ V2x))\ V1v)))))) \end{aligned}$$