

thm_2Equotient_2ECOND__RSP (TMFykaFf2vHchR62CgSHRP7zLRztbh22K6P)

October 26, 2020

Definition 1 We define `c_2Emin_2E_3D` to be $\lambda A. \lambda x \in A. \lambda y \in A. \text{inj_o } (x = y)$ of type $\iota \Rightarrow \iota$.

Definition 2 We define `c_2Emin_2E_3D_3D_3E` to be $\lambda P \in 2. \lambda Q \in 2. \text{inj_o } (p P \Rightarrow p Q)$ of type ι .

Definition 3 We define `c_2Ebool_2ET` to be $(\text{ap } (\text{ap } (\text{c_2Emin_2E_3D } (2^2)) (\lambda V0x \in 2. V0x)) (\lambda V1x \in 2. V1x))$

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

Definition 5 We define `c_2Ebool_2E_2F_5C` to be $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (\text{ap } (\text{c_2Ebool_2E_21 } 2) (\lambda V2t \in 2. V2t))))$

Definition 6 We define `c_2Equotient_2EQUOTIENT` to be $\lambda A. 27a : \iota. \lambda A. 27b : \iota. \lambda V0R \in ((2^{A-27a})^{A-27a}). \lambda V1R \in ((2^{A-27b})^{A-27b}). \text{inj_o } (R1 = R2)$

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

Definition 8 We define `c_2Ebool_2EF` to be $(\text{ap } (\text{c_2Ebool_2E_21 } 2) (\lambda V0t \in 2. V0t))$.

Definition 9 We define `c_2Ebool_2E_7E` to be $(\lambda V0t \in 2. (\text{ap } (\text{ap } (\text{c_2Emin_2E_3D_3D_3E } V0t) (\text{c_2Ebool_2EF } 2))))$

Definition 10 We define `c_2Emin_2E_40` to be $\lambda A. \lambda P \in 2^A. \text{if } (\exists x \in A. p (\text{ap } P x)) \text{ then } (\text{the } (\lambda x. x \in A \wedge p (\text{ap } P x)))$ of type $\iota \Rightarrow \iota$.

Definition 11 We define `c_2Ebool_2ECOND` to be $\lambda A. 27a : \iota. (\lambda V0t \in 2. (\lambda V1t1 \in A. 27a. (\lambda V2t2 \in A. 27a. (\text{c_2Ebool_2ECOND } 27a))))$

Assume the following.

$$\text{True} \tag{1}$$

Assume the following.

$$(\forall V0t1 \in 2. (\forall V1t2 \in 2. (((p V0t1) \Rightarrow (p V1t2)) \Rightarrow (((p V1t2) \Rightarrow (p V0t1)) \Rightarrow ((p V0t1) \Leftrightarrow (p V1t2)))))) \tag{2}$$

Assume the following.

$$(\forall V0t \in 2. (\text{False} \Rightarrow (p V0t))) \tag{3}$$

Assume the following.

$$(\forall V0t \in 2.((p V0t) \vee (\neg(p V0t)))) \quad (4)$$

Assume the following.

$$\begin{aligned} & (\forall V0t \in 2.(((True \Leftrightarrow (p V0t)) \Leftrightarrow (p V0t)) \wedge (((p V0t) \Leftrightarrow True) \Leftrightarrow \\ & (p V0t)) \wedge (((False \Leftrightarrow (p V0t)) \Leftrightarrow (\neg(p V0t))) \wedge (((p V0t) \Leftrightarrow False) \Leftrightarrow (\neg(\\ & p V0t)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall A.27a.nonempty A.27a \Rightarrow (\forall V0t1 \in A.27a. (\forall V1t2 \in \\ & A.27a. (((ap (ap (ap (c.2Ebool.2ECOND A.27a) c.2Ebool.2ET) V0t1) \\ & V1t2) = V0t1) \wedge ((ap (ap (ap (c.2Ebool.2ECOND A.27a) c.2Ebool.2EF \\ & V0t1) V1t2) = V1t2)))) \end{aligned} \quad (6)$$

Theorem 1

$$\begin{aligned} & \forall A.27a.nonempty A.27a \Rightarrow \forall A.27b.nonempty A.27b \Rightarrow (\\ & \forall V0R \in ((2^{A.27a})^{A.27a}). (\forall V1abs \in (A.27b)^{A.27a}). \\ & (\forall V2rep \in (A.27a)^{A.27b}). ((p (ap (ap (ap (c.2Equotient.2EQUOTIENT \\ & A.27a A.27b) V0R) V1abs) V2rep)) \Rightarrow (\forall V3a1 \in 2. (\forall V4a2 \in \\ & 2. (\forall V5b1 \in A.27a. (\forall V6b2 \in A.27a. (\forall V7c1 \in A.27a. \\ & (\forall V8c2 \in A.27a. (((p V3a1) \Leftrightarrow (p V4a2)) \wedge ((p (ap (ap V0R V5b1) \\ & V6b2)) \wedge (p (ap (ap V0R V7c1) V8c2)))) \Rightarrow (p (ap (ap V0R (ap (ap (ap (c.2Ebool.2ECOND \\ & A.27a) V3a1) V5b1) V7c1)) (ap (ap (ap (c.2Ebool.2ECOND A.27a) V4a2) \\ & V6b2) V8c2)))))))))) \end{aligned}$$