

thm_2Ehtrat_2ETRAT_SUCINT (TMRbedame- qUm1dMDdF82mW726R6NAz29RgE)

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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 $ty_2Enum_2Enum : \iota$ be given. Assume the following.

$$nonempty\ ty_2Enum_2Enum \tag{1}$$

Let $ty_2Epair_2Eprod : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow \forall A1.nonempty\ A1 \Rightarrow nonempty\ (ty_2Epair_2Eprod\ A0\ A1) \tag{2}$$

Let $c_2Ehtrat_2Etrat_add : \iota$ be given. Assume the following.

$$c_2Ehtrat_2Etrat_add \in (((ty_2Epair_2Eprod\ ty_2Enum_2Enum\ ty_2Enum_2Enum)^{(ty_2Epair_2Eprod\ ty_2Enum_2Enum)}) \tag{3}$$

Let $c_2Enum_2EREP_num : \iota$ be given. Assume the following.

$$c_2Enum_2EREP_num \in (\omega^{ty_2Enum_2Enum}) \tag{4}$$

Let $c_2Enum_2ESUC_REP : \iota$ be given. Assume the following.

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \tag{5}$$

Let $c_2Enum_2EABS_num : \iota$ be given. Assume the following.

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \tag{6}$$

Definition 3 We define $c_2Ebool_2E_21$ to be $\lambda A.\lambda a : \iota.(\lambda V0P \in (2^{A \cdot 27a}).(ap (ap (c_2Emin_2E_3D (2^{A \cdot 27a}))$

Definition 4 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum.(ap\ c_2Enum_2EABS_num\ ($

Let $c_2Enum_2EZERO_REP : \iota$ be given. Assume the following.

$$c_2Enum_2EZERO_REP \in \omega \tag{7}$$

Definition 5 We define c_2Enum_2E0 to be $(ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP)$.

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

Definition 7 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (c_2Ebool_2E_21\ 2)\ (\lambda V2t \in 2.$

Let $c_2Epair_2EABS_prod : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow c_2Epair_2EABS_prod\ A_27a\ A_27b \in ((ty_2Epair_2Eprod\ A_27a\ A_27b)^{(2^{A_27b})^{A_27a}}) \quad (8)$$

Definition 8 We define $c_2Epair_2E_2C$ to be $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda V0x \in A_27a.\lambda V1y \in A_27b.(ap\ (c_2E$

Definition 9 We define $c_2Ehrat_2Etrat_1$ to be $(ap\ (ap\ (c_2Epair_2E_2C\ ty_2Enum_2Enum\ ty_2Enum_2Enum$

Let $c_2Ehrat_2Etrat_sucint : \iota$ be given. Assume the following.

$$c_2Ehrat_2Etrat_sucint \in ((ty_2Epair_2Eprod\ ty_2Enum_2Enum\ ty_2Enum_2Enum)^{ty_2Enum_2Enum}) \quad (9)$$

Let $c_2Ehrat_2Etrat_eq : \iota$ be given. Assume the following.

$$c_2Ehrat_2Etrat_eq \in ((2^{(ty_2Epair_2Eprod\ ty_2Enum_2Enum\ ty_2Enum_2Enum)})^{(ty_2Epair_2Eprod\ ty_2Enum_2Enum)}) \quad (10)$$

Assume the following.

$$True \quad (11)$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a.((V0x = V0x) \Leftrightarrow True)) \quad (12)$$

Assume the following.

$$(((ap\ c_2Ehrat_2Etrat_sucint\ c_2Enum_2E0) = c_2Ehrat_2Etrat_1) \wedge (\forall V0n \in ty_2Enum_2Enum.(ap\ c_2Ehrat_2Etrat_sucint\ (ap\ c_2Enum_2ESUC\ V0n))) = (ap\ (ap\ c_2Ehrat_2Etrat_add\ (ap\ c_2Ehrat_2Etrat_sucint\ V0n))\ c_2Ehrat_2Etrat_1)))) \quad (13)$$

Assume the following.

$$\begin{aligned} & (\forall V0p \in (ty_2Epair_2Eprod\ ty_2Enum_2Enum\ ty_2Enum_2Enum)). \\ & (\forall V1q \in (ty_2Epair_2Eprod\ ty_2Enum_2Enum\ ty_2Enum_2Enum)). \quad (14) \\ & ((V0p = V1q) \Rightarrow (p\ (ap\ (ap\ c_2Ehrat_2Etrat_eq\ V0p\ V1q)))) \end{aligned}$$

Theorem 1

$$\begin{aligned} & ((p\ (ap\ (ap\ c_2Ehrat_2Etrat_eq\ (ap\ c_2Ehrat_2Etrat_sucint\ c_2Enum_2E0)) \\ & \quad c_2Ehrat_2Etrat_1)) \wedge (\forall V0n \in ty_2Enum_2Enum.(p\ (ap\ (ap\ c_2Ehrat_2Etrat_eq\ (ap\ c_2Ehrat_2Etrat_sucint\ (ap\ c_2Enum_2ESUC\ V0n))) \\ & \quad (ap\ (ap\ c_2Ehrat_2Etrat_add\ (ap\ c_2Ehrat_2Etrat_sucint\ V0n))\ c_2Ehrat_2Etrat_1)))))) \end{aligned}$$