

Definition 9 We define $c_2Epair_2EUNCURRY$ to be $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda A_27c : \iota.\lambda V0f \in ((A_27c^{A_27b}$

Assume the following.

$$True \tag{5}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0t \in 2.((\forall V1x \in A_27a.(p\ V0t)) \Leftrightarrow (p\ V0t))) \tag{6}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a.((V0x = V0x) \Leftrightarrow True)) \tag{7}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow (\forall V0f \in (A_27b^{A_27a}).(\forall V1g \in (A_27b^{A_27a}).((V0f = V1g) \Leftrightarrow (\forall V2x \in A_27a.((ap\ V0f\ V2x) = (ap\ V1g\ V2x)))))) \tag{8}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow \forall A_27c.nonempty\ A_27c \Rightarrow (\forall V0f \in (A_27b^{A_27a}).(\forall V1g \in (A_27a^{A_27c}).(\forall V2x \in A_27c.((ap\ (ap\ (ap\ (c_2Ecombin_2Eo\ A_27c\ A_27b\ A_27a)\ V0f)\ V1g)\ V2x) = (ap\ V0f\ (ap\ V1g\ V2x)))))) \tag{9}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow \forall A_27c.nonempty\ A_27c \Rightarrow (\forall V0f \in ((A_27c^{A_27b})^{A_27a}).(\forall V1g \in (A_27b^{A_27a}).(\forall V2x \in A_27a.((ap\ (ap\ (ap\ (c_2Ecombin_2ES\ A_27a\ A_27b\ A_27c)\ V0f)\ V1g)\ V2x) = (ap\ (ap\ V0f\ V2x)\ (ap\ V1g\ V2x)))))) \tag{10}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow (\forall V0x \in (ty_2Epair_2Eprod\ A_27a\ A_27b).((ap\ (ap\ (c_2Epair_2E_2C\ A_27a\ A_27b)\ (ap\ (c_2Epair_2EFST\ A_27a\ A_27b)\ V0x))\ (ap\ (c_2Epair_2ESND\ A_27a\ A_27b)\ V0x)) = V0x)) \tag{11}$$

Theorem 1

$$\begin{aligned} & \forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow \forall A_27c. \\ & \quad nonempty\ A_27c \Rightarrow \forall A_27d.nonempty\ A_27d \Rightarrow (\forall V0f \in ((\\ & \quad \quad A_27c^{A_27d})(ty_2Epair_2Eprod\ A_27a\ A_27b)).(\forall V1g \in ((\\ & \quad \quad A_27d^{A_27b})^{A_27a}).((ap\ (ap\ (c_2Ecombin_2ES\ (ty_2Epair_2Eprod \\ & \quad \quad A_27a\ A_27b)\ A_27d\ A_27c)\ V0f)\ (ap\ (c_2Epair_2EUNCURRY\ A_27a\ A_27b \\ & \quad \quad A_27d)\ V1g)) = (ap\ (c_2Epair_2EUNCURRY\ A_27a\ A_27b\ A_27c)\ (ap\ (ap \\ & \quad \quad (c_2Ecombin_2ES\ A_27a\ (A_27d^{A_27b})\ (A_27c^{A_27b}))\ (ap\ (ap\ (c_2Ecombin_2Eo \\ & \quad \quad A_27a\ ((A_27c^{A_27b})^{(A_27d^{A_27b}))}\ ((A_27c^{A_27d})^{A_27b}))\ (c_2Ecombin_2ES \\ & \quad \quad A_27b\ A_27d\ A_27c))\ (ap\ (ap\ (c_2Ecombin_2Eo\ A_27a\ ((A_27c^{A_27d})^{A_27b}) \\ & \quad \quad ((ty_2Epair_2Eprod\ A_27a\ A_27b)^{A_27b}))\ (ap\ (c_2Ecombin_2Eo\ A_27b \\ & \quad \quad (A_27c^{A_27d})\ (ty_2Epair_2Eprod\ A_27a\ A_27b))\ V0f))\ (c_2Epair_2E_2C \\ & \quad \quad A_27a\ A_27b))))\ V1g)))))) \end{aligned}$$