

Ld1.	Ld1	$\vdash = Def_{[(\iota \rightarrow o, \iota \rightarrow o) \rightarrow o]}(Ld1_{[\iota \rightarrow o]}, \lambda X_{[\iota]} \bullet E_{[\iota \rightarrow o]}(F_{[(\iota, \iota) \rightarrow \iota]}(S_{[\iota \rightarrow \iota]}(N_{[\iota \rightarrow \iota]}(F_{[\iota \rightarrow \iota]}(X))))))$	
A5.	A5	$\vdash \forall X_{[\iota]} \bullet [D_{[\iota \rightarrow o]}(X) \Rightarrow D(s(X))]$	(Hyp)
L10.	$\mathcal{H}_1$	$\vdash \forall Dc-8215_{[\iota]} \bullet [\forall Dc-8244_{[\iota \rightarrow o]} \bullet [Dc-8244(One_{[\iota]}) \wedge$ $\forall Dc-8248_{[\iota]} \bullet [Dc-8244(Dc-8248) \Rightarrow$ $Dc-8244(s(Dc-8248))] \Rightarrow Dc-8244(Dc-8215)] \wedge$ $D(Dc-8215)] \Rightarrow [\forall Dc-8261_{[\iota \rightarrow o]} \bullet [Dc-8261(One) \wedge$ $\forall Dc-8265_{[\iota]} \bullet [Dc-8261(Dc-8265) \Rightarrow$ $Dc-8261(s(Dc-8265))] \Rightarrow Dc-8261(s(Dc-8215))] \wedge$ $D(s(Dc-8215))]]]$	(Otter A5)
L9.	$\mathcal{H}_1$	$\vdash \forall Y_{[\iota]} \bullet [E(Y) \Rightarrow E(s(Y))]$	(Defsi L10)
A4.	A4	$\vdash D(One)$	(Hyp)
L8.	$\mathcal{H}_1$	$\vdash [\forall Dc-8208_{[\iota \rightarrow o]} \bullet [Dc-8208(One)$ $\forall Dc-8212_{[\iota]} \bullet [Dc-8208(Dc-8212)$ $Dc-8208(s(Dc-8212))] \Rightarrow Dc-8208(One)] \wedge D(One)]$	(Otter A4)
L7.	$\mathcal{H}_1$	$\vdash E(One)$	(Defsi L8)
L11.	$\mathcal{H}_1$	$\vdash E(s(One))$	(Otter L7,L9)
A1.	A1	$\vdash \forall N_{[\iota]} \bullet F(N, One) = s(One)$	(Hyp)
L28.	$\mathcal{H}_2$	$\vdash E(F(s(N_1), One))$	(Otter A1,L11)
L27.	$\mathcal{H}_2$	$\vdash Ld_1(One)$	(Defn-Contract-Local-Def L28,Ld1)
L25.	L25	$\vdash \forall Dc-8362_{[\iota]} \bullet [N_{[\iota \rightarrow o]}(Dc-8362) \Rightarrow E(F(N_1, Dc-8362))]$	(Hyp)
L31.	L31	$\vdash Ld_1(N_2_{[\iota]})$	(Hyp)
L33.	Ld1, L31	$\vdash E(F(s(N_1), N_2))$	(Defn-Expand-Local-Def L31,Ld1)
L34.	Ld1, L31	$\vdash [N(F(s(N_1), N_2)) \wedge D(F(s(N_1), N_2))]$	(Defne L33)
A3.	A3	$\vdash \forall N, X_{[\iota]} \bullet F(s(N), s(X)) = F(N, F(s(N), X))$	(Hyp)
L35.	$\mathcal{H}_3$	$\vdash E(F(s(N_1), s(N_2)))$	(Otter A3,L34,L25)
L32.	$\mathcal{H}_3$	$\vdash Ld_1(s(N_2))$	(Defn-Contract-Local-Def L35,Ld1)
L30.	$\mathcal{H}_2$	$\vdash [Ld_1(N_2) \Rightarrow Ld_1(s(N_2))]$	( $\Rightarrow I$ L32)
L29.	$\mathcal{H}_2$	$\vdash \forall X_{[\iota]} \bullet [Ld_1(X) \Rightarrow Ld_1(s(X))]$	( $\forall I$ L30)
L42.	$\mathcal{H}_2$	$\vdash \forall Dc-8449_{[\iota]} \bullet [\forall Dc-8460_{[\iota \rightarrow o]} \bullet [Dc-8460(One)$ $\forall Dc-8464_{[\iota]} \bullet [Dc-8460(Dc-8464)$ $Dc-8460(s(Dc-8464))] \Rightarrow Dc-8460(Dc-8449)] \Rightarrow$ $Ld_1(Dc-8449)]$	(Otter L29,L27)
L41.	$\mathcal{H}_2$	$\vdash \forall X_{[\iota]} \bullet [N_{[\iota \rightarrow o]}(X) \Rightarrow Ld_1(X)]$	(Defni L42)
L43.	$\mathcal{H}_2$	$\vdash \forall Dc-8472_{[\iota]} \bullet [N(Dc-8472) \Rightarrow E(F(s(N_1), Dc-8472))]$	(Defn-Expand-Local-Def L41,Ld1)
L26.	$\mathcal{H}_2$	$\vdash \forall Dc-8366_{[\iota]} \bullet [N(Dc-8366) \Rightarrow E(F(s(N_1), Dc-8366))]$	(Otter L43)
L24.	$\mathcal{H}_1$	$\vdash [\forall Dc-8362_{[\iota]} \bullet [N(Dc-8362) \Rightarrow E(F(N_1, Dc-8362))] \Rightarrow$ $\forall Dc-8366_{[\iota]} \bullet [N(Dc-8366) \Rightarrow E(F(s(N_1), Dc-8366))]]]$	( $\Rightarrow I$ L26)
L23.	$\mathcal{H}_1$	$\vdash \forall Dc-8350_{[\iota]} \bullet [\forall Dc-8362_{[\iota]} \bullet [N(Dc-8362)$ $E(F(Dc-8350, Dc-8362))] \Rightarrow \forall Dc-8366_{[\iota]} \bullet [N(Dc-8366) \Rightarrow$ $E(F(s(Dc-8350), Dc-8366))]]]$	( $\forall I$ L24)
L22.	$\mathcal{H}_1$	$\vdash \forall N \bullet [M_{[\iota \rightarrow o]}(N) \Rightarrow M(s(N))]$	(Defni* L23)
L17.	$\mathcal{H}_1$	$\vdash E(F(One, One))$	(Otter A1,L11)
L16.	$\mathcal{H}_1$	$\vdash Q_{[\iota \rightarrow o]}(One)$	(Defni L17)
A2.	A2	$\vdash \forall X_{[\iota]} \bullet F(One, s(X)) = s(s(F(One, X)))$	(Hyp)
L19.	$\mathcal{H}_1$	$\vdash \forall Dc-8293_{[\iota]} \bullet [E(F(One, Dc-8293))$ $E(F(One, s(Dc-8293)))]$	(Otter A2,L9)
L18.	$\mathcal{H}_1$	$\vdash \forall X_{[\iota]} \bullet [Q(X) \Rightarrow Q(s(X))]$	(Defni* L19)
L20.	$\mathcal{H}_1$	$\vdash \forall Dc-8312_{[\iota]} \bullet [\forall Dc-8323_{[\iota \rightarrow o]} \bullet [Dc-8323(One)$ $\forall Dc-8327_{[\iota]} \bullet [Dc-8323(Dc-8327)$ $Dc-8323(s(Dc-8327))] \Rightarrow Dc-8323(Dc-8312)] \Rightarrow$ $Q(Dc-8312)]$	(Otter L18,L16)
L15.	$\mathcal{H}_1$	$\vdash \forall X_{[\iota]} \bullet [N_{[\iota \rightarrow o]}(X) \Rightarrow Q(X)]$	(Defni L20)
L21.	$\mathcal{H}_1$	$\vdash \forall Dc-8335_{[\iota]} \bullet [N(Dc-8335) \Rightarrow E(F(One, Dc-8335))]$	(Defne L15)
L14.	$\mathcal{H}_1$	$\vdash \forall Dc-8282_{[\iota]} \bullet [N(Dc-8282) \Rightarrow E(F(One, Dc-8282))]$	(Otter L21)
L13.	$\mathcal{H}_1$	$\vdash M(One)$	(Defni L14)
L37.	$\mathcal{H}_1$	$\vdash \forall Dc-8397_{[\iota]} \bullet [\forall Dc-8408_{[\iota \rightarrow o]} \bullet [Dc-8408(One)$ $\forall Dc-8412_{[\iota]} \bullet [Dc-8408(Dc-8412)$ $Dc-8408(s(Dc-8412))] \Rightarrow Dc-8408(Dc-8397)] \Rightarrow$ $M(Dc-8397)]$	(Otter L13,L22)
L36.	$\mathcal{H}_1$	$\vdash \forall Nn_{[\iota]} \bullet [N(Nn) \Rightarrow M(Nn)]$	(Defni L37)

L38.	$\mathcal{H}_1$	$\vdash \forall Dc-8422[_\iota] \blacksquare [N(Dc-8422) \Rightarrow \forall Dc-8430[_\iota] \blacksquare [N(Dc-8430) \Rightarrow$ $E(F(Dc-8422, Dc-8430))]]$	(Defne L36)
L12.	$\mathcal{H}_1$	$\vdash \forall Nn[_\iota] \blacksquare [N(Nn) \Rightarrow \forall X[_\iota] \blacksquare [N(X) \Rightarrow E(F(Nn, X))]]$	(Otter L38)
L6.	$\mathcal{H}_1$	$\vdash \forall Dc-8189[_\iota \rightarrow o] \blacksquare [[Dc-8189(One)$ $\forall Dc-8193[_\iota] \blacksquare [Dc-8189(Dc-8193)$ $Dc-8189(s(Dc-8193))]] \Rightarrow Dc-8189(s(s(s(One))))]$	$\wedge$ (Otter) $\Rightarrow$
L5.	$\mathcal{H}_1$	$\vdash N(s(s(s(One))))$	(Defsi L6)
L39.	$\mathcal{H}_1$	$\vdash E(F(s(s(s(One))), s(s(s(One)))))$	(Otter L5, L12)
L40.	$\mathcal{H}_1$	$\vdash [N(F(s(s(s(One))), s(s(s(One)))))$ $D(F(s(s(s(One))), s(s(s(One)))))]$	$\wedge$ (Defne L39)
Conc.	$\mathcal{H}_1$	$\vdash D(F(s(s(s(One))), s(s(s(One)))))$	(Otter L40)

$\mathcal{H}_1 = A1, A2, A3, A4, A5, Ld1$

$\mathcal{H}_2 = A1, A2, A3, A4, A5, Ld1, L25$

$\mathcal{H}_3 = A1, A2, A3, A4, A5, Ld1, L25, L31$