NUN axioms
NUN problems

NUN019+1.p Peano greater and unequal
$\forall x$: greater$(s(x), x)$ fof(greater$_0$, axiom)
$\forall x, y$: (greater$(x, y) \Rightarrow$ greater$(s(x), y)$) fof(greater$_1$, axiom)
$\forall x, y$: (greater$(x, y) \Rightarrow x \neq y$) fof(not_equal$_0$, axiom)

NUN020+1.p Axioms for RDN arithmetic
include('Axioms/NUM005+0.ax')
include('Axioms/NUM005+1.ax')
include('Axioms/NUM005+2.ax')

NUN021^1.p Axioms for Church Numerals in Simple Type Theory
include('Axioms/NUM006^0.ax')

NUN022^1.p Find this function
Does there exist a function f from reals to reals such that for all x and y, f(x + y * y) - f(x) >= y?
$\exists f$: \$real $\rightarrow$ \$real: $\forall x$: \$real, y: \$real: (\$lesseq@(\$difference@(f@(\$sum@x@(\$product@y@y)))@(f@x))@y) thf(jasmin, co

NUN023^1.p Function h s.t. h(0) = 1, h(1) = 0, no witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_5, type)
s: \$i $\rightarrow$ \$i thf(n_6, type)
ite: \$o $\rightarrow$ \$i $\rightarrow$ \$i $\rightarrow$ \$i thf(n_7, type)
($\forall x$: \$o, u: \$i, v: \$i: ($x \Rightarrow$ (ite@x@u@v) $= u$) and $\forall x$: \$o, u: \$i, v: \$i: ($\neg x \Rightarrow$ (ite@x@u@v) $= v$)) $\Rightarrow \exists h$: \$i $\rightarrow$ \$i: ((h@0) = (s@0) and (h@(s@0)) = 0) thf(n_8, conjecture)

NUN023^2.p Function h s.t. h(0) = 1, h(1) = 0, with witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i $\rightarrow$ \$i thf(n_7, type)
ite: \$o $\rightarrow$ \$i $\rightarrow$ \$i $\rightarrow$ \$i thf(n_8, type)
h: \$i $\rightarrow$ \$i thf(n_9, type)
($\forall x_{100}$: \$o, u: \$i, v: \$i: ($x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= u$) and $\forall x_{100}$: \$o, u: \$i, v: \$i: ($\neg x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= v$) and $\forall x$: \$i: (h@x) = (ite@x = 0@(s@0)@0)) $\Rightarrow \exists h$: \$i $\rightarrow$ \$i: ((h@0) = (s@0) and (h@(s@0)) = 0) thf(n_{10}, conjecture)

NUN024^1.p Function h s.t. h(0) = 1, h(1) = 0, h(2) = 0, no witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i $\rightarrow$ \$i thf(n_7, type)
ite: \$o $\rightarrow$ \$i $\rightarrow$ \$i $\rightarrow$ \$i thf(n_8, type)
($\forall x_{100}$: \$o, u: \$i, v: \$i: ($x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= u$) and $\forall x_{100}$: \$o, u: \$i, v: \$i: ($\neg x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= v$) and $\forall x$: \$i: (s@x) $\neq 0$ and $\forall x$: \$i: (s@x) $\neq x$) $\Rightarrow \exists h$: \$i $\rightarrow$ \$i: ((h@0) = (s@0) and (h@(s@0)) = 0 and (h@(s@(s@0))) = 0) thf(n_9, conjecture)

NUN024^2.p Function h s.t. h(0) = 1, h(1) = 0, h(2) = 0, with witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i $\rightarrow$ \$i thf(n_7, type)
ite: \$o $\rightarrow$ \$i $\rightarrow$ \$i $\rightarrow$ \$i thf(n_8, type)
h: \$i $\rightarrow$ \$i thf(n_9, type)
($\forall x_{100}$: \$o, u: \$i, v: \$i: ($x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= u$) and $\forall x_{100}$: \$o, u: \$i, v: \$i: ($\neg x_{100} \Rightarrow$ (ite@x_{100}@u@v) $= v$) and $\forall x$: \$i: (s@x) $\neq 0$ and $\forall x$: \$i: (s@x) $\neq x$ and $\forall x$: \$i: (h@x) = (ite@x = 0@(s@0)@0)) $\Rightarrow \exists h$: \$i $\rightarrow$ \$i: ((h@0) = (s@0) and (h@(s@0)) = 0 and (h@(s@(s@0))) = 0) thf(n_{10}, conjecture)

NUN025^1.p Function h s.t. h(0) = 1, h(1) = 0, h(2) = 1, no witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i $\rightarrow$ \$i thf(n_7, type)
ite: \$o $\rightarrow$ \$i $\rightarrow$ \$i $\rightarrow$ \$i thf(n_8, type)

$(\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = u)$ and $\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (\neg\, x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = v)$ and $\forall x\colon \$i\colon (s@x) \neq x) \Rightarrow \exists h\colon \$i \to \$i\colon ((h@0) = (s@0)$ and $(h@(s@0)) = 0$ and $(h@(s@(s@0))) = (s@0))$ thf(n_9, conj

NUN025∧2.p Function h s.t. h(0) = 1, h(1) = 0, h(2) = 1, with witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i → \$i thf(n_7, type)
ite: \$o → \$i → \$i → \$i thf(n_8, type)
h: \$i → \$i thf(n_9, type)
$(\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = u)$ and $\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (\neg\, x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = v)$ and $\forall x\colon \$i\colon (s@x) \neq x$ and $\forall x\colon \$i\colon (h@x) = (\text{ite}@x = (s@0)@0@(s@0))) \Rightarrow \exists h\colon \$i \to \$i\colon ((h@0) = (s@0)$ and $(h@(s@0)) = 0$ and $(h@(s@(s@0))) = (s@0))$ thf(n_{10}, conjecture)

NUN025∧3.p Function h s.t. h(0) = 1, h(1) = 0, h(2) = 1, with witness
Using an axiomatiztion of if-then-else, find the if-then-else term that expresses the function H.
0: \$i thf(n_6, type)
s: \$i → \$i thf(n_7, type)
ite: \$o → \$i → \$i → \$i thf(n_8, type)
h: \$i → \$i thf(n_9, type)
$(\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = u)$ and $\forall x_{100}\colon \$o, u\colon \$i, v\colon \$i\colon (\neg\, x_{100} \Rightarrow (\text{ite}@x_{100}@u@v) = v)$ and $\forall x\colon \$i\colon (s@x) \neq 0$ and $\forall x\colon \$i\colon (s@x) \neq x$ and $\forall x\colon \$i\colon (h@x) = (\text{ite}@x = 0@(s@0)@(\text{ite}@x = (s@0)@0@(s@0)))) \Rightarrow \exists h\colon \$i \to \$i\colon ((h@0) = (s@0)$ and $(h@(s@0)) = 0$ and $(h@(s@(s@0))) = (s@0))$ thf(n_{10}, conjecture)