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PPL – Assignment 5

Part 4

Question 1

A = t(s(s), G, s, p, t(K), s)
B = t(s(G), G, s, p, t(K), U)

1. Sub = { s = G }
   A°Sub = t(s(s), s, s, p, t(K), s)
   B°Sub = t(s(s), s, s, p, t(K), U)

2. Sub = { s = G, s = U }
   A°Sub = t(s(s), s, s, p, t(K), s)
   B°Sub = t(s(s), s, s, p, t(K), s)

   Answer: Sub = { s = G, s = U}

Question 2

A = g(l, M, g, G, U, g, v(M))
B = g(l, v(U), g, v(M), v(G), g, v(M))

1. Sub = { M = v(U) }
   A°Sub = g(l, v(U), g, G, U, g, v(v(U)))

B°Sub = g(l, v(U), g, v(v(U)), v(G), g, v(v(U)))

2. Sub = { M = v(U), G = v(v(U)) }
   A°Sub = g(l, v(U), g, v(v(U), U, g, v(v(U)))
   B°Sub = g(l, v(U), g, v(v(U)), v(v(v(U))), g, v(v(U)))

3. Sub = { M = v(U), G = v(v(U)), U = v(v(v(U))) }

   Answer: fails – when extending { M = v(U), G = v(v(U)) } with { U = v(v(v(U))) }

Question 3

A = m(M, N)
B = n(M, N)

Answer: fails – different functors can't be unified.

Question 4

A = p([v | [V | VV]])
B = p([[v | V] | VV])

1. Sub = { v = [v | V] }

   Answer: fails – when trying to extend { v = [v | V] }

Question 5

A = g([T])
B = g(T)

1. Sub = { T = [T] }

   Answer: fails – when trying to extend { T = [T] }

Part 5

Question 2

The answer is X = s(zero).

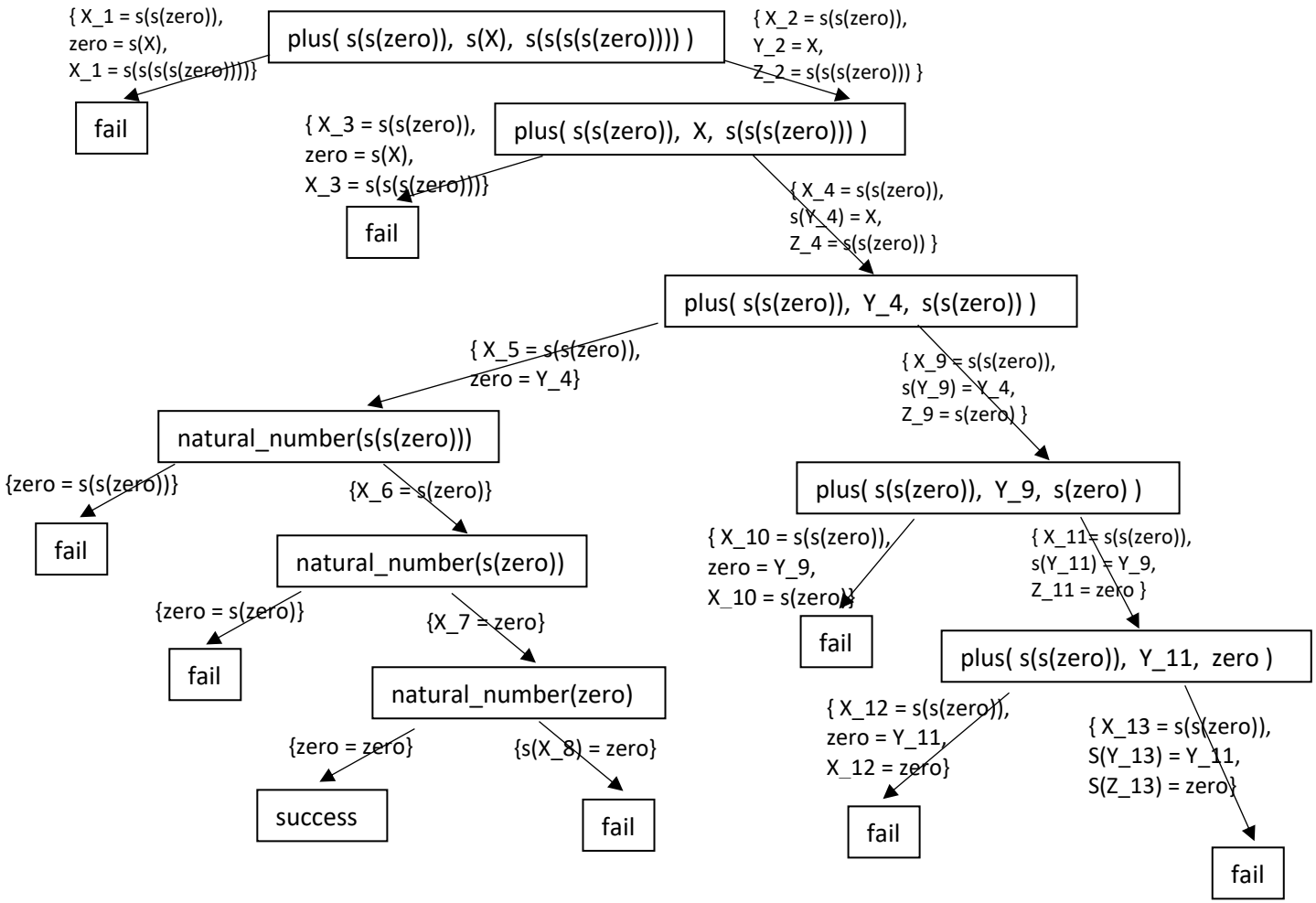
Question 3

This is a success proof tree because there is one success leaf.

Question 4

This is a finite tree because each branch in the tree is finite as well.

Question 1


{ X_1 = s(s(zero)),
zero = s(X),
X_1 = s(s(s(s(zero))))}
plus(s(s(zero)), s(X), s(s(s(s(zero)))))
{ X_2 = s(s(zero)),
Y_2 = X,
Z_2 = s(s(s(zero))) }
fail
{ X_3 = s(s(zero)),
zero = s(X),
X_3 = s(s(s(zero))))}
plus(s(s(zero)), X, s(s(s(zero))))
fail
{ X_4 = s(s(zero)),
s(Y_4) = X,
Z_4 = s(s(zero)) }
plus(s(s(zero)), Y_4, s(s(zero)))
{ X_5 = s(s(zero)),
zero = Y_4}
{ X_9 = s(s(zero)),
s(Y_9) = Y_4,
Z_9 = s(zero) }
natural_number(s(s(zero)))
plus(s(s(zero)), Y_9, s(zero))
{zero = s(s(zero))}
{X_6 = s(zero)}
fail
{ X_10 = s(s(zero)),
zero = Y_9,
X_10 = s(zero)}
{ X_11 = s(s(zero)),
s(Y_11) = Y_9,
Z_11 = zero }
natural_number(s(zero))
fail
plus(s(s(zero)), Y_11, zero)
{zero = s(zero)}
{X_7 = zero}
fail
natural_number(zero)
{ X_12 = s(s(zero)),
zero = Y_11,
X_12 = zero}
{ X_13 = s(s(zero)),
S(Y_13) = Y_11,
S(Z_13) = zero}
{zero = zero}
{s(X_8) = zero}
fail
success
fail
fail