PM definitions of 'the' and class notation

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The

*14.01 [(ιx)(Fx)].G(ιx)(Fx) =df (∃b)((x)(Fx equ x = b) & Gb

*14.02 E!(ιx)(Fx) =df (∃b) (x) (Fx equ x = b)

*14.03 [(ιx)(Fx),(ιx))(Gx)]f{(ιx)(Fx))(ιx)(Gx)} =df [(ιx)(Fx).[ι(x)(Gx)]f(ιx)(Fx),)(ιx)(Gx)}

*14.04 [(ιx)(Gx)].f{(ιx)(Fx),(ιx)(Gx) =df [((ιx)(Gx),(ιx)(Fx)]f{(ιx)(Fx),(ιx)(Gx)}

Classes

Zc is z with carrot

ε is class membership sign

*20.01 f {zc (Gz) } =df (∃F)((x) F!x equ Gx) & f{ F! zc}

*20.02 x ε (F ! zc) =df F ! x

My understanding is as follows (I found it difficult to figure out & think Whitehead and Russell should and could have explained it better.)

*20.01 says (the class of z such that Gx) has the property f.

*20.02 says x is a member of F ! zc

I think *20.02 is intended really to be part of a special case of *20.01 where fx = x ε (F ! zc)

So *20.02 could be stated better y ε (zc(Gz)) =df (∃F)((x) F!x equ G!x) & G!(F! y))

I worked out this for prolog on another page.

The reason for this complexity is to make classes extensional, without taking them primitive.

Predicates are taken primitive and , though perhaps unrelated I think it is necessary to explain the grue problem , and

also how we learn language.

I also demonstrate how classes, so defined, are extensional with a couple sample cases & my prolog definitions.

I think that the notion of predicative function (indicated by !) was an attempt to block the paradoxes.

But the axiom of reducibility ruins that.

There is no way to tell, or at least described, how to tell if there is such a predicative function.

We can tell not(x ε x) is not predicative.

But I think there is no general way tell!

If f is predicative you can substitute it in f(zc G z) and eventually get a finite result in terminals.

URL for Entire Text Of Principia Mathematica

I have been told this is a 1st edition. I have the 2nd . The page numbers are different, but the section numbers are the same.

http://quod.lib.umich.edu/cgi/t/text/text-idx?c=umhistmath;idno=AAT3201.0001.001

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