

# Re: Computability and logic

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- *From:* "Tom" <[tkorna@xxxxx](mailto:tkorna@xxxxx)>
  - *Date:* 29 Sep 2006 08:41:54 -0700
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george wrote:

Tom wrote:

It is just that little part I mentioned that has continued to make me bounce off for several months now.

In this context (as opposed to the Post context), substitution is for supplying arguments to functions, or for applying functions defined with argument-VARIABLES, TO argument-TERMS. You have a function definition like  $F(x,y,z)=df='stuff'x'otherstuff'y'morestuff'z$  and you want to know what  $F(1,2,3)$  is; you want to substitute 1 for x, 2 for y, and 3 for z to get  $F(1,2,3)='stuff'1'otherstuff'2'morestuff'3$ .

I have shown the thing on the right, the result, as a string, composed of other concatenated strings, but in this paradigm, that is NOT the default composition of things in general. Things in general are TERMS. They look like  $p(a,b,c)$  or  $s(s(s(0)))$ ; they the SAME kind of TREE structure that function-applications and predicate-applications have.

These trees do not have to be binary but they can all be re-represented as binary.

My point is that there is a vast amount of literature in logic and term-rewriting involving TERM-substitutions (for variables) as opposed to substring substitutions that will accomplish the same objective.

Yes, George, I understand. Thank you. I was just thinking I am really trying to establish what Goedel's  $Bew(x,y)$  really is, you know. I mean, I am trying to reach a single string which incorporates both the

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starting sequences and the rules of inference (Bew) from the inside, which is impossible. But, again, if it is impossible how we do that at all? I mean, given a TM description and a tape, how do you apply the description to the tape to obtain another tape. Don't you need a meta, and meta-meta, and meta-meta-meta ... machine to do that? You do. Still, we manage to do the thing. How?

Thank you very much for writing.  
Tom

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