

# Re: Comparing Proofs of Rosser's 1936 Theorem

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- *From:* David C. Ullrich <ullrich@xxxxxxxxxxxxxxxxxxxx>
  - *Date:* Sun, 05 Mar 2006 05:43:12 -0600
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On 4 Mar 2006 17:08:38 -0800, "Charlie-Boo" <shymathguy@xxxxxxxx> wrote:

David C. Ullrich wrote:

On 3 Mar 2006 06:42:50 -0800, "Charlie-Boo" <shymathguy@xxxxxxxx> wrote:

David C. Ullrich wrote:

On 19 Feb 2006 15:15:30 -0800,  
"Charlie-Boo" <chvol@xxxxxxxx> wrote:

What is the relationship  
between the following two  
proofs of Rosser's  
1936 theorem?

1. [Turing 1937] We can list  
the provable sentences, and  
by negating  
each list the refutable  
sentences. If the system is  
both complete and  
consistent then any given  
sentence will be provable or  
refutable but  
not both, and thus will be  
seen in either but not both  
lists, and we  
can tell if the given sentence  
is provable, which amounts  
to solving  
the halting problem where

## Re: Comparing Proofs of Rosser's 1936 Theorem

halt yes means provable and  
halt no means  
refutable, so halt means  
decidable.

2. [C-B 2005] If the system  
is both complete and  
consistent, then the  
refutable sentences coincide  
with the unprovable  
sentences, but the  
former is an r.e. set whereas  
the latter is not.

They're essentially the same proof.

The first is written out in much more detail,  
perhaps  
because the concepts mentioned in the  
second were less  
well-known in 1937 or perhaps just because  
it happens  
to be written out in more detail. And of  
course there  
are various other ways the details could be  
filled  
in in the second.

But the two are essentially the  
same – the one basic idea appears in both  
proofs,  
in different words.

Really? Well, you really beat me on that one, David. I  
thought they  
were different. So, what is the basic idea that appears in  
both? I  
want to learn where I went wrong and correct my mistake.

I thought # 2 was shorter, simpler, doesn't involve knowing  
the proof  
that the Halting Problem is unsolvable, and is easier to  
understand.

What is the "one basic idea" that you are referring to that you  
discovered appears in both proofs?

## Re: Comparing Proofs of Rosser's 1936 Theorem

The basic idea in your quote(?) of Turing is given by what you wrote.

You wrote, "They're essentially the same proof. . . . The one basic idea appears in both proofs, in different words." But where does Turing's argument appear within mine? What is the "basic" idea that you were referring to? Or is it all just a lie to try to deny me credit for my discovery?

It's obviously not true to say there're the same proof. My proof is much shorter and simpler than Turing's. He describes the construction of a decision procedure for theorems, and then relies on the proof of the unsolvability of the Halting Problem. My proof, on the other hand, does not involve writing a decision procedure nor does it rely on the unsolvability of the Halting Problem. Instead, I merely rely on known facts concerning the provable and refutable sentences.

Precisely. Your \_version\_ of the proof looks simpler because it uses these known facts instead of explaining why those same facts are true.

I find my proof easier to understand than Turing's because it doesn't use a decision procedure and only relies on simple comparisons of sets with known properties.

How can you say they are the same?

Read my lips: they are essentially the same proof.

See, that was very easy.

Honestly, are you just trying to deny me credit for coming up with a proof – in fact, one simpler (and thus arguably better) than Turing's? You are only making an assertion that flies in the face of the facts – a blatant lie – in a desperate attempt to deny the obvious fact that my proof is not only different, it is much simpler in the principles that it uses and the overall complexity of the proof is simpler.

Puhlease.

The difference is that when a person reads my proof he is apt to find it easier to understand than the Turing proof.

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That may well be. It doesn't follow that they're not essentially the same argument.

Thus it is a better proof in that regard.

But to take two different proofs such as these, and the reader can see they are different and that one is simpler and easier to understand, and then say, "No, you might think there's a difference, but there really isn't." is a real joke. It is a lie that is a desperate attempt to deny someone credit for a mathematical discovery.

A "desperate" attempt? Right. A "mathematical discovery"? Right. If you really think that "your proof" is not simply obvious that's very sad.

You should try to publish it, then get back to us concerning the desperate attempts of the editors and referees to deny you credit for this discovery.

Btw, make certain not to include an appendix on how  $\sim(x \varepsilon x)$  is not a wff, or how truth has nothing to do with models, etc. The editor/referee might find that, um, distracting.

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David C. Ullrich

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