

Re: What is the 1st order formal system known as PA?

Source: <http://sci.tech-archive.net/Archive/sci.logic/2005-11/msg00447.html>

- *From:* "Rupert" <rupertmccallum@xxxxxxxxx>
 - *Date:* 21 Nov 2005 02:08:35 -0800
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MoeBlee wrote:

> Rupert wrote:

>>> So any model of those axioms is a real closed field but not every model

>>> of those axioms is a complete ordered field. Do I have that right?

>>

>> Yes.

>>

>>> So

>>> it's a twist, no?, that it turns out that if you take the definition in

>>> set theory of 'a complete ordered field' and restate it as first order

>>> axioms, then its class of models is the class of real closed fields

>>> instead of the class of complete ordered fields.

>>>

>>

>> Well, it's not that surprising. The first-order axiom schema states

>> that the least upper bound principle applies to those sets which are

>> parametrically definable by formulas. There are only countable many

>> such sets. So it's not surprising that this should turn out to be

>> weaker than the full second-order least upper bound principle.

>

> Right. But does that mean that all real closed fields are complete

> ordered fields, but not vice versa? I'll address these fields in my

> studies later. But for the purpose of this discussion about

> isomorphisms and models, this would help to know.

>

All complete ordered fields are real-closed fields (in fact, all complete ordered fields are isomorphic to \mathbb{R}), but not all real-closed fields are complete ordered fields.

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• *References:*

- ◆ *What is the 1st order formal system known as PA?*

Re: What is the 1st order formal system known as PA?

◇ *From:* Nam Nguyen

◆ **Re: What is the 1st order formal system known as PA?**

◇ *From:* David C . Ullrich

◆ **Re: What is the 1st order formal system known as PA?**

◇ *From:* MoeBlee

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