

## Re: Epistemology 201: The Science of Science

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>>Not at all. I would say that mathematics includes set theory, which is  
>>an extension of logic. When proofs in set theory are performed, they  
>>are not at odds with its formal system. I'm arguing that all valid  
>>mathematical proofs are in accordance with one formal system or another,  
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>  
> Okay. But is there a formal system to formal systems? And if not where  
> is the formality of the system defined? Obviously it isn't arbitrary  
> or you would simply call it the system and not the formal system. So  
> there must be principles of formality in formal systems.

Good point to raise. A formal system is defined as two grammars. One describing the language, what a 'well formed formula' (wff) is, and the other describing rules of inference, what sentence forms follows from what. So one describes state and the other describes state-change.

So note that the rules of inference tend to describe the /form/ inferences take. So it is this form, not the particular content, that is important. I figure this is what is meant by 'formal'.

So in general, a formal system is a static language that has rules for moving from one sentence to another. And that these rules are precise enough so that the language does not need to have a meaning, that it can be done by syntax alone.

With this said, formal systems can be studied. Because formal systems are not particularly restrictive, they could quite easily be couched in a meta-language and/or meta-rules. There is a lot of scope for creativity and intuition of course. The formalisms just lay down some constraints.