

MANY CHEERFUL FACTS

presents

A talk on axioms of the type proposed by Freiling, or What happens when set theorists play darts

a talk by Adam Booth

12:10 am - 1:00 on Wednesday, January 26th, in room
1015.

Note: No prior knowledge of set theory will be assumed in this talk. If you know what a bijection is, you'll be fine!

We all know from Godel's incompleteness theorems that any sufficiently powerful axiom system will either be incomplete or inconsistent. This doesn't normally bother mathematicians in most fields, as the incompletenesses (that is the unanswerable questions) occur in quite artificial parts of their theories, not in parts they're actually interested in. This isn't so in set theory, where several questions mathematicians have actively spent time investigating have been found to be independent of the standard axioms of set theory, ZFC.

One of the great things about set theory is how other mathematical objects can be imitated inside it. In this talk, I'm going to present a family of new axiom candidates which Chris Freiling has proposed to add to ZFC which are motivated by our intuition about how to imitate the reals inside set theory. Hopefully, I'll have time to show three things. Firstly, that they have interesting consequences in set theory. Secondly, that they have consequences for other areas of mathematics (I'll prove a strengthening of a classical theorem in the Lebesgue's theory of real analysis). Thirdly, that they're probably wrong. Quite how much I'll prove will depend on the timings.

*I am the very model of a modern Major General,
I've information vegetable, animal, and mineral,
I know the kings of England, and I quote the fights historical
From Marathon to Waterloo, in order categorical;
I'm very well acquainted, too, with matters mathematical,
I understand equations, both the simple and quadratical,
About binomial theorem I'm teeming with a lot o' news,
With many cheerful facts about the square of the hypotenuse!*

- Gilbert & Sullivan $P \circ P$