VCU Discrete Mathematics Seminar

What do ultrafilters have to do with finite graphs?

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VCU Math!

Wednesday, Sept. 21
1:00-1:50
4145 Harris Hall

Ultrafilters over $\mathbb{N}$ are certain combinatorial objects constructed using Zorn's Lemma. Given a sequence $\vec{G} = \langle G_n : n \in \mathbb{N} \rangle$ of, say, finite graphs, an ultrafilter can be used to construct an *ultraproduct* of $\vec{G}$, and if P is a *first order* property such that all but finitely many of the G_n's have property P, then the ultraproduct also has property P. Although such an ultraproduct is typically very large—in fact uncountably infinite—it can still be used to provide information about the behavior of random *finite* graphs; for example, to prove the famous 0-1 laws for the limiting behavior of finite random graphs. All of these are classic results due to Fagin and Glebskii-Kogan-Liagonkii-Talanov independently.

This talk is a preview to one of the topics to be covered in the Spring 2017 special topics course *Filters, ultrafilters, and applications* (Math 591.002).

For the Fall 2016 DM seminar schedule, see:

`http://www.people.vcu.edu/~clarson/discrete-seminar-fall-2016.html`