USING NONSTANDARD MODELS OF ARITHMETIC TO PROVE COMBINATORIAL THEOREMS

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I will talk about how we can use nonstandard models of arithmetic to prove finitary combinatorial theorems from infinitary combinatorial theorems.

I will start by outlining the necessary background in mathematical logic, including the definition of nonstandard model of arithmetic.

Then I will show how a nonstandard model of arithmetic can be used to prove the finitary version of Ramsey's Theoirem from the infinitary version.

Finally, I will show how the finite delta system lemma (Erdos and Rado, 1960) can be proved from the uncountable delta system lemma (Sanin, 1946) with the help of a certain kind of nonstandard model of arithmetic.

These talks should be accessible to all graduate students.