Department of Mathematics and Computer Science

Monday, December 1, 2014, 4:10

COLLOQUIUM TALK

Old Main 2231

Gordon's Conjectures:

Pontryagin-van Kampen Duality and

Fourier Transform in Hyperfinite Ambience

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Abstract

Using the ideas of E. I. Gordon [Go1], [Go2] we present an approach, based on *nonstandard analysis* (NSA), to simultaneous approximation of locally compact abelian (LCA) groups and their duals by finite abelian groups, as well as to approximation of the Fourier transforms on various functional spaces over them by the discrete Fourier transform. In 2012 we proved the three Gordon's Conjectures (GC1–3) which were open since 1991 and are crucial both in the formulations and proofs of the LCA groups and Fourier transform approximation theorems. The proofs of GC1 and GC2 combine some methods of NSA with Fourier-analytic methods of *additive combinatorics*, stemming from the paper [GR] by Green and Ruzsa and the book [TV] by Tao and Vu. The proof of GC3 relies on a fairly general nonstandard version of the *Smoothness-and-Decay Principle.*

Depending on time, we will survey most of the above mentioned constructions and results.

REFERENCES

[Go1] E. I. Gordon, *Nonstandard analysis and locally compact abelian groups*, Acta Appl. Math. **25** (1991), 221–239.

[Go2] E. I. Gordon, *Nonstandard Methods in Commutative Harmonic Analysis*, Translations of Mathematical Monographs, vol. 164, Amer. Math. Soc., Providence, R. I., 1997.

[GR] B. Green, I. Ruzsa, *Freiman's theorem in an arbitrary abelian group*, J. London Math. Soc. (2) **75** (2007), 163–175.

[TV] T. Tao, V. Vu, *Additive Combinatorics*, Cambridge University Press, Cambridge-New York, etc., 2006.

SNACKS IN FACULTY LOUNGE AT 3:15 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)