INVITATION

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# DIFFERENTIATION OF SUBSETS OF SEMIGROUPS, A RAMSEY THEOREM, AND A VAN DER CORPUT LEMMA

Abstract:

A major theme in ergodic Ramsey theory is proving multiple recurrence results for measure-preserving actions of semigroups. What often lies at the heart of these results is that mixing ($\approx$ "chaotic") along a suitable filter on the semigroup amplifies itself to multiple mixing ($\approx$ even more "chaotic") along the same filter. This amplification is usually proved using a so-called van der Corput difference lemma. Instances of this lemma for specific filters have been proven before by Furstenberg, Bergelson–McCutcheon, and others, with a somewhat different proof in each case. We define a notion of differentiation for subsets of semigroups and isolate a class of filters that respect this notion. The filters in this class (call them $\partial$-filters) include all those, for which the van der Corput lemma was known, and our main result is a van der Corput lemma for $\partial$-filters, which thus generalizes its previous instances. This is done via proving a Ramsey theorem for graphs on the semigroup.

**THURSDAY, MAY 12, 2016**
Tea at 3:30pm in the KGRC meeting room (room 104)
Talk at 4:00pm in the KGRC lecture room (room 101)
GÖDEL RESEARCH CENTER
JOSEPHINUM, 1090 WIEN, WÄHRINGER STRASSE 25

**o.Univ.-Prof. Dr. Sy-David Friedman**