



Dear Colleagues!

Institute of Mathematics of the University of Georgia is pleased to invite you to the Online Tbilisi Analysis & PDE Seminar. The seminar is held bi-weekly on Tuesdays at 20 : 00 local time in Tbilisi.

Talk on May 28, 2024

Speaker: Prof. **Zhirayr Avetisyan**, Ghent University.

<https://www.z-avetisyan.com/>

"Universal Functions and Sets"

Abstract: Universal objects in mathematics are those which are capable of, in one sense or another, representing most other objects of the same category. In the context of Fourier analysis, universality is understood in the sense of approximations by orthogonal or Fourier series.

The first part of the talk will be devoted to universal functions. Roughly speaking, a function is universal if its Fourier series has universal properties, e.g., its partial sums converge to any given function in a space. There are variations of this, including possible rearrangements and changes of signs. We will establish very general results about the existence of universal functions for minimal systems in Banach spaces, which obey very basic approximation properties. On the other hand, it is clear that in a Banach space the partial sums of a Fourier series cannot converge to different functions. Therefore we introduce the slightly weaker notion of asymptotic universality, and obtain existence results under fairly mild assumptions.

The second part of the talk will be concerned with universal sets. In addition to approximation in norm, one often needs to approximate a given function spatially, i.e., the approximating function should agree with the original one identically on a large subset of the domain. In this respect, the classical example is Luzin's theorem, where measurable functions are approximated by continuous ones. However, the arbitrarily large subset of coincidence in Luzin's theorem depends on the original function. It is remarkable, that for certain kinds of approximation the subset can be chosen a priori, independent of the function being approximated, making it universal. While results in this direction abound for classical systems, we will introduce sweeping generalisations, as well as covariant constructions in homogeneous spaces of compact topological groups.

Date: May 28, 2024

Time: 20 : 00 local time in Tbilisi;

(Compare to your local time: <https://www.timeanddate.com/worldclock/georgia/tbilisi>);

How to join:

The seminar is organized on the **Cisco Webex Meetings**. If you are already registered, you do not need to register again. Otherwise, to join the seminar please send an e-mail to seminarim@ug.edu.ge or register here:

<https://forms.gle/xfQJ9fg1uqe7CrZw6>

You will then receive further information.

WEB of Seminar: <https://www.ug.edu.ge/en/tbilisi-analysis-and-pde-seminars>

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2. E. Shargorodsky, Department of Mathematics, King's College London
3. G. Tephnadze, Institute of Mathematics, University of Georgia, Tbilisi

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