



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 November 14, 2023

Speaker: Prof. **Joao Pedro Gonçalves Ramos**, Postdoctoral researcher at École Polytechnique Fédérale de Lausanne;
<https://sites.google.com/view/gionnoramos/>

"Time-frequency localization operators, their eigenvalues and relationship to elliptic PDE"

Abstract: In the classical realm of time-frequency analysis, an object of major interest is the short-time Fourier transform of a function. This object is a modified Fourier transform of a signal $f(x)$, changed by a certain 'window function', in order to make simultaneous analysis on frequency and time more feasible. Since the pioneering work of Daubechies, time-frequency localisation operators have been of extreme importance in that analysis. These operators are defined to measure how much the short-time Fourier transform of a function concentrates in the time-frequency plane, and thus the study of the eigenvalues and eigenfunctions of such operators is intimately connected to how well one can perform the simultaneous analysis of signals mentioned above.

In this talk, we will explore the case where the window function is a Gaussian. We will discuss some classical and recent results on domains of maximal time-frequency concentration, their eigenvalues, and stability/inverse problems associated with such properties. During this investigation, we shall see that many of these problems possess some rather unexpected connections with calculus of variations, overdetermined elliptic boundary value problems and free boundary problems.

Date: November 14, 2023

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>

Organizers:

R. Duduchava, Institute of Mathematics, University of Georgia, Tbilisi

E. Shargorodsky, Department of Mathematics, King's College London

G. Tephnadze, Institute of Mathematics, University of Georgia, Tbilisi

Secretary:

M. Tsaava, Institute of Mathematics, University of Georgia, Tbilisi

Technical support:

G. Tutberidze, Institute of Mathematics, University of Georgia, Tbilisi

Z. Vashakidze, Institute of Mathematics, University of Georgia, Tbilisi

