



Dear Colleagues!

V. Kupradze 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 March 4, 2025**

**Speaker:** Dr. Ryan O'Loughlin, University of Reading.  
<https://www.ryanoloughlin.co.uk/>

**"Numerical Ranges and Crouzeix's Conjecture"**

**Abstract:** The numerical range of a matrix is a convex compact subset of the complex plane. This is a fundamental concept in linear algebra and finds uses in numerical analysis through approximation of eigenvalues, and in functional analysis via Crouzeix's Conjecture. In this talk I will give a brief introduction to the numerical range of a matrix and present a new proof that the numerical range of a 2-by-2 matrix is an ellipse. I will then give a background on Crouzeix's Conjecture, which is an open conjecture which bounds the norm of a polynomial applied to a matrix by a constant multiplied by the supremum of the polynomial over the numerical range of the matrix. Finally, I will present new recently published results studying the continuity of the constant appearing in Crouzeix's Conjecture.

**Date:** March 4, 2025

**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 **Zoom Platform**. 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](mailto: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:

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

### Secretary:

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

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