



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 Wednesdays at 20 : 00 local time in Tbilisi.

Talk on November 12, 2025

Speaker: Prof. **Andreas Rupp**, Saarland University. <https://andreas-rupp.eu/>

"Sufficient conditions for QMC analysis of finite elements for parametric differential equations"

Abstract: Parametric regularity of discretizations of flux vector fields satisfying a balance law is studied under some assumptions on a random parameter that links the flux with an unknown primal variable (often through a constitutive law). In the primary example of the stationary diffusion equation, the parameter corresponds to the inverse of the diffusivity.

The random parameter is modeled here as a Gevrey-regular random field. Specific focus is on random fields expressible as functions of countably infinite sequences of independent random variables, which may be uniformly or normally distributed. Quasi-Monte Carlo (QMC) error bounds for some quantity of interest that depends on the flux are then derived using the parametric regularity. It is shown that the QMC method converges optimally if the quantity of interest depends continuously on the primal variable, its flux, or its gradient. A series of assumptions are introduced with the goal of encompassing a broad class of discretizations by various finite element methods. The assumptions are verified for the diffusion equation discretized using conforming finite elements, mixed methods, and hybridizable discontinuous Galerkin schemes. Numerical experiments confirm the analytical findings, highlighting the role of accurate flux approximation in QMC methods.

Date: November 12, 2025

Time: 20 : 00 local time in Tbilisi;

(Compare to your local time: [https://www.timeanddate.com/worldclock/georgia/tbilisi\);](https://www.timeanddate.com/worldclock/georgia/tbilisi)

How to join:

The seminar is organized on the **Google Meet Platform**. If you are already registered, you do not need to register again. Otherwise, to join the seminar please send an e-mail to kim@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. A. Meskhi, Kutaisi International University, Kutaisi

Secretary:

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

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