



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 Mondays at 16 : 00 GMT (at 17 : 00 CET, at 20 : 00 local time in Tbilisi).

Talk on March 14, 2022

Speaker: Prof. **Hans Georg Feichtinger**, University of Vienna;
<https://www.ei.tum.de/lti/team/gastprofessoren/prof-dr-hans-georg-feichtinger/>

The title of the lecture: “The Banach Gelfand Triple and its role in Classical Fourier Analysis and Operator Theory”

Abstract: The Banach Gelfand Triple $(S_0, L_2, S_0^*)(\mathbb{R}^d)$ (which arose in the context of Time-Frequency Analysis) is a simple and useful tool, both for the derivation of mathematically valid theorems AND for teaching relevant concepts to engineers and physicists (and of course mathematicians, interested in applications!).

In this context the basic terms of an introductory course on Linear System's Theory can be explained properly: Translation invariant systems viewed as linear operators, which can be described as convolution operator by some impulse response, whose Fourier transform is well defined (and is called transfer function), and there is a kernel theorem: Operators $T : S_0(\mathbb{R}^d)$ to $S_0^*(\mathbb{R}^d)$ have a "matrix representation" using some σ in $S_0^*(\mathbb{R}^{2d})$.

Most importantly, dual space $S_0^*(\mathbb{R}^d)$, the space of so-called mild distributions, contains all kinds of objects relevant for signal processing: periodic signals, discrete signals, and of course discrete and periodic signals. One can show that the generalized Fourier transform for such functions works well and reduced to the DFT/FFT (Fast Fourier Transform).

An important tool is the STFT (Short-Time Fourier Transform). Mild distributions are exactly those tempered distributions which have a bounded short-time Fourier transform, and the w^* -convergence just corresponds to uniform convergence of the STFT over compact subsets of the time-frequency plane.

Date: March 14, 2022

Time: 16 : 00 GMT (17 : 00 CET and 20 : 00 local time in 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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