

Bahçeşehir University, Istanbul, Türkiye
Analysis & PDE Center, Ghent University, Ghent, Belgium
Institute Mathematics & Math. Modeling, Almaty, Kazakhstan

“Analysis and Applied Mathematics”

Weekly Online Seminar

Seminar leaders:

Prof. Allaberen Ashyralyev (BAU, Istanbul),
Prof. Michael Ruzhansky (UGent, Ghent),
Prof. Makhmud Sadybekov (IMMM, Almaty)

Date: Tuesday, March 11, 2025

Time: 13.00-14.00 (Istanbul) = 11.00-12.00 (Ghent) = 15.00-16.00 (Almaty)

Zoom link: <https://us02web.zoom.us/j/6678270445?pwd=SFNmQUlVTDtRaHlDa-VYrN3I5bzJVQT09>, **Conference ID:** 667 827 0445, **Access code:** 1

Speaker:

Prof. Dr. Alexander Meskhi

Kutaisi International University and TSU A. Razmadze Mathematical Institute, Georgia

Title: **Multilinear fractional integrals: boundedness criteria and sharp estimates**

Abstract: Necessary and sufficient conditions on a measure μ guaranteeing the boundedness of the multilinear fractional integral operator $T_{\gamma,\mu}^{(m)}$ (defined with respect to a measure μ) from the product of Lorentz spaces $\prod_{k=1}^m L_{\mu}^{r_k, s_k}$ to the Lorentz space $L_{\mu}^{p,q}(X)$ are derived. The results are new even for linear fractional integrals $T_{\gamma,\mu}$ (i.e., for $m = 1$). From the general results we obtain a criterion for the validity of the Sobolev inequality for $T_{\gamma,\mu}^{(m)}$ in Lorentz spaces defined with respect to μ . We investigate the same problem for Morrey-Lorentz spaces.

Sharp form for the Olsen's inequality in multilinear setting is obtained. Criteria for the boundedness of multilinear Riesz potential operator from Lebesgue space to a Lebesgue space with weight will be presented.

Finally, weighted criteria for the boundedness of m -linear Riemann-Liouville operators will be also discussed.

Talk is based on the papers [1]–[5].

References:

- [1] L. Grafakos and A. Meskhi, *On sharp Olsen's and trace inequalities for multilinear fractional integrals*, *Potential Analysis* **59** (2023), 1039-1050.
- [2] V. Kokilashvili, M. Mastilo and A. Meskhi, *On the Boundedness of Multilinear Fractional Integral Operators*, *J. Geome. Anal.* **30** (2020), 667-679.
- [3] V. Kokilashvili and A. Meskhi, *Fractional integrals on measure spaces*, *Fract. Calc. Appl. Anal.* **4** (2001), No.1, 1–24.
- [4] A. Meskhi and L. Natelashvili, *Boundedness criteria for linear and multilinear fractional integral operators in Lorentz spaces*, *Trans. A. Razmadze Math. Inst.* **178** (2024), No. 2, 331-333.
- [5] A. Meskhi and L. Natelashvili, *Boundedness criteria for linear and multilinear fractional integral operators in Lorentz spaces (to appear)*.

Biography:

Prof. Alexander Meskhi received his PhD degree in 1998 and Doctor of Science degree in 2001 from the A. Razmadze Mathematical Institute of the Georgian National Academy of Sciences, Georgia. He is currently a professor at Kutaisi International University and the head of the Department of Mathematical Analysis at the TSU A. Razmadze Mathematical Institute. Prof. A. Meskhi is the author of 6 monographs and many scientific papers. He is a member of the editorial boards of several international journals. For more information, you may check his detailed CV at <https://rmi.tsu.ge/~meskhi/>.