Bahçeşehir University, Istanbul, Turkey
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, January 10, 2023**
Time: 14.00-15.00 (Istanbul) = 12.00-13.00 (Ghent) = 17.00-18.00 (Almaty)

Zoom link: https://us02web.zoom.us/j/6678270445?pwd=SFNmQUIvT0tRaH-lDaVYrN3l5bzJVQT09, **Conference ID:** 667 827 0445, **Access code:** 1

Speaker:

Prof. Dr. Lev Birbrair
Federal University of Ceará (Brazil) and Jagiellonian University (Poland)

Title: **Resonance Sequences and Focal Decompositions (where Differential Equations meet Number Theory)**

Abstract: Focal decomposition of Peixoto associated to an ordinary differential equation of the second order is a partition of the set of all two-points boundary value problems according to the number of their solutions. Two equations are called focally equivalent if there exists a homomorphism of the set of two-points problems to itself such that the image of the focal decomposition associated to the first equation is a focal decomposition associated to the second one.

Let $\alpha = \{\alpha_1, \dots, \alpha_k\}$ be a finite multiset of non-negative real numbers. Consider the sequence of all positive integer multiples of all α_i's, and note the multiplicity of each term in this sequence. This sequence of multiplicities is the **resonance sequence** generated by $\{\alpha_1, \dots, \alpha_k\}$. Two multisets are **combinatorially equivalent** if they generate the same resonance sequence.

We show that the problem of combinatorial equivalence of multisets is closely related to the problem of classification of systems of second order ordinary differential equations up to focal equivalence.

The lecture is dedicated to the memory of Prof. Dr. Marina Sobolevsky, the principal collaborator of some important works in this direction.

Biography:

Lev Birbrair – is now a Professor at Federal University of Ceará (Brazil) and Jagiellonian University (Poland). He obtained his Ph.D. in 1994 from Hebrew University of Jerusalem. His research interests lie in the area of Real Algebraic Geometry and Singularity Theory. He has also worked in Geometric Theory of Differential Equations and in Number Theory.
Prof. Lev Birbrair is known as one of the worldwide leading researchers in Metric Theory of Singularities and in Lipschitz Geometry.