Euler International Mathematical Institute
Saint Petersburg

October 1-5, 2018
Monday-Friday 10:00-11:00

Amos Nevo (Technion)

"Effective ergodic theorems for algebraic and arithmetic groups, and their applications to lattice point counting problems and Diophantine approximation"

We will begin by discussing aspects of ergodic theory and representation theory of group actions, including a discussion of property T and the spectral gap property.

We will then show that for algebraic and arithmetic groups it is possible to sharpen and extend the spectral estimates arising from property T considerably beyond their usual formulations. We will also discuss how to derive, in certain favorable situations, best possible spectral estimates via representation theory.

In turn, these spectral estimates will be used to derive effective ergodic theorems in actions of the groups under consideration. We will then show how the rate of convergence in the effective ergodic theorems implies effective solutions in a host of natural problems.

These will include non-Euclidean lattice point counting problems, fast equidistribution of lattice orbits on homogenous spaces, exponents of Diophantine approximation on homogeneous spaces (including some best possible ones), and effective solution counts to intrinsic Diophantine inequalities on homogeneous algebraic varieties, as time permits.

Our goal is to give an exposition of the subjects mentioned which is suitable for a diverse audience, and which is fairly explicit and not too technical. Many open problems will be indicated along the way.

Researchers and graduate students are encouraged to participate.