

Speaker: Giorgos Kotsovolis

Title: Bass note spectra of binary forms

Abstract: Mahler's program of determining the set

$$\text{Spec}(P) := \left\{ \inf_{\underline{x} \in \Lambda \setminus \underline{0}} |P(\underline{x})|, \Lambda \subset \mathbb{R}^2 \text{ a unimodular lattice} \right\}$$

for some homogeneous form P of non-zero discriminant is central in the geometry of numbers. Restricting to the case of binary forms, the discussion is classical for quadratics. In the case of binary cubic forms, Mordell determined the extremal lattices and further conjectured the existence of spectral gaps. Some months later, Davenport disproved this conjecture, by proving the existence of almost extremal lattices. In this talk, we resolve this spectral problem for all binary cubic forms and more generally for all binary forms P of degree $n \geq 3$. Specifically, we show that $\text{Spec}(P)$ is an interval of the form $[0, M_P]$, if P is \mathbb{R} -isotropic and of the form $(0, M_P]$ if not.