Seshadri constants, Diophantine approximation, and Roth's theorem for arbitrary varieties

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If X is a variety of general type defined over a number field k, then the Bombieri–Lang conjecture predicts that the k-rational points of X are not Zariski dense. One way to view the conjecture is that a global condition on the canonical bundle (that it is "generically positive") implies a global condition on rational points. By a well-established principle in geometry, we should also look for local influence of positivity on the local accumulation of rational points. To do this we need measures of both phenomena.

Let L be an ample line bundle on X, and x an algebraic point. The central theme of the talk is the interrelations between $a(x, L)$, an invariant measuring how quickly rational points accumulate at x, and $e(x, L)$, the Seshadri constant, measuring the local positivity of L near x.

In particular, the classic approximation theorems on the line—the theorems of Liouville and Roth—generalize as inequalities between $a(x, L)$ and $e(x, L)$ valid for all projective varieties.

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