SCHOLAR
Une célébration scientifique soulignant les lignes ouvertes de la recherche mathématique en l'honneur de l'héritage mathématique du Pr M. Ram Murty à l'occasion de son 60e anniversaire
15 au 17 octobre 2013

SCHOLAR
A Scientific Celebration Highlighting Open Lines of Arithmetic Research in Honour of Professor M. Ram Murty's Mathematical Legacy on His 60th Birthday
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On the hyperbolic lattice point problem

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The general problem is to estimate the number of points of the orbit Γz inside a disc of increasing radius, where Γ acts discontinuously on a metric space X. For the Euclidean disc this relates to representations as sum of two squares. There is a long history for this problem and a well-studied conjecture of Hardy for the error term. For hyperbolic space and cofinite groups e.g. SL(2, Z) Selberg proved an error term $O(X^{2/3})$ (unpublished), which has never been improved for a single group. Various other mathematicians worked on this: Huber, Patterson, and Phillips-Rudnick, who first showed a lower bound for the error term. All results lead to conjecture an error of order $O(X^{1/2+\varepsilon})$. I will explore various averages and lower bounds in this problem for SL(2, Z), using results that depend strongly on arithmeticity, via the study of Maass cusp forms.

I will report also on another variation of this problem, due to Huber, where the new estimates on the error term use the large sieve for $\Gamma\ H$, first studied by Chamizo.

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