数論セミナーのお知らせ

日時: 2024 年 7 月 19 日 (金) 16:40〜
場所: D814
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Title : The smooth Weyl law with uniform power savings

Abstract : For a compact Riemannian manifold, the Weyl law describes the asymptotic behavior of the number of eigenvalues of the underlying Laplace operator. Understanding lower order or error terms remains particularly challenging. In the more general context of locally symmetric spaces, the spectral theory of the Laplacian is intimately related to the theory of automorphic forms (among which are elliptic curves, modular or Maass forms, Galois representations...) and similar questions arise.

It is therefore natural to ask for such a Weyl law to hold for families of all automorphic forms of a given reductive group. Until recently, however, all the known asymptotics were for automorphic forms with fixed aspects. In some sense, this amounts to picking a "slice" of the space of automorphic forms only. Unfortunately, making explicit the hidden dependencies in the featured error term does not allow to sum over these aspects to obtain a uniform counting law: existing results did not allow to patch back together the slices.

In their recent achievement, Brumley and Milicevic obtained a uniform Weyl law for GL(2), using the trace formula of Arthur, but with an error term saving only by a power of log. Simplifying the very general setting of this work, and going back to ideas used a long time ago by Drinfeld in the setting of function fields, we obtained a power savings in the smooth Weyl law for the universal family of all automorphic forms of GL(2). The idea is to study a suitable "conductor zeta function", and to deduce a counting law by Tauberian arguments, mimicking a standard strategy in the realm of counting rational points on varieties.

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