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The Eisenstein–Siegel cocycles and p-adic zeta functions of real quadratic fields

The main goal of this talk is to explain an explicit way of constructing the p-adic partial zeta function of quadratic real fields out of the so-called Eisenstein–Siegel distribution which is a p-adic locally analytic distribution on a rational vector space with rational poles. The p-adic zeta function of real quadratic fields (more generally, totally real fields) have been constructed by several people including Delinge–Ribet (using p-adic Hilbert modular forms and schemes), Pierre Cassou-Nougues (using Shintani's formula), and Coates–Sinnott (using Siegel's formula and Stickelberger element only for real quadratic case). But our construction is more explicit and computable in some way and so it can be applied to the p-adic construction of elliptic units for real quadratic fields (p-adic Gross–Stark units developed by Darmon–Dasgupta) which is conjectured to be global units and serves as an approach to explicit class field theory for real quadratic fields. This construction is also geometric in some sense, since it uses the Borel–Serre completion of the complex upper half plane.

Some part of the results in this talk is a joint work with Glenn Stevens.