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Spectral gap and effective equidistribution

Abstract: The dynamics on homogeneous spaces has many interesting connections to number theory. One of the main problems here is to understand the distribution of closed orbits for subgroups H of the ambient Lie group G . In joint work with G. Margulis and A. Venkatesh we prove an error rate in the equidistribution for semisimple subgroups H acting on congruence quotients of G . This makes use of spectral gap in the form of property (τ) . However, the proof of our theorem can also be used to prove all cases of property (τ) except for groups of type A_1 . We will discuss the relationship between spectral gap, effective decay of matrix coefficients, and effective equidistribution, as well as the main ideas of our argument.