Representation growth and zeta functions

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Timetable: 16 hours. First lecture on November 6, 2018, 09:00 (dates already fixed, see calendar), Torre Archimede, Room 2BC/30.

Course requirements: Basic notions from algebra, number theory and group theory.
Further knowledge in one (or several) of the following areas is useful, but not strictly necessary: representation theory, p-adic numbers, profinite groups, analytic number theory. (We will introduce ad hoc all particular notions needed, but our treatment will feel less ad hoc, if one has seen these topics before.)

Examination and grading:

SSD: MAT/02

Aim:

Course contents:
The aim of the course is to introduce a general audience to a range of ideas and techniques that have found their way into asymptotic group theory during the last 20 years, in particular into the study of representation zeta functions of algebraic groups, arithmetic groups and compact p-adic groups. These zeta functions are Dirichlet generating functions reflecting the distribution of irreducible representations according to their degrees. We will approach the subject and some of the technical details by means of fairly concrete examples, such as the special linear groups over finite fields, over the complex numbers and over non-archimedean valuation rings. Proofs of corresponding general theorems will be sketched; they require the use of some ‘black boxes’ which we will set up precisely and motivate (but won’t have time to prove in full). Considerable emphasis will be placed on clarifying the basic definitions and notions to newcomers. As a road map we will use in a loose sense the fundamental paper of Larsen and Lubotzky on Representation growth of linear groups (2008). Hopefully the course will make this and other papers in the area more accessible.