

Geometry, Physics, and Representation Theory
Northeastern University

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“Small” Representations of Finite Classical Groups.

Abstract

Suppose you have a finite group G and you want to study certain related structures (e.g., random walks, Cayley graphs, word maps, etc.). In many cases, this might be done using sums over the characters of G . A serious obstacle in applying these Fourier type formulas is lack of knowledge on the low dimensional representations of G . In fact, numerics shows that the “small” representations tend to contribute the largest terms to these sums, so a systematic knowledge on them might assist in the solution of important problems.

In this talk I will discuss a joint project (see arXiv:1609.01276) with Roger Howe (Yale/Texas AM). We introduce a language to speak about “size” of a representation, and we develop a method (called “eta correspondence”) that produces analytic information on (conjecturally all the) “small” representations of finite classical groups. The talk should be accessible to anyone with basic linear algebra knowledge. I will illustrate our theory with concrete motivations and numerical data obtained with John Cannon (MAGMA, Sydney) and Steve Goldstein (Scientific computing, Madison).