

School of Mathematics

Course 426 — Complex representations of finite groups
(JS & SS Mathematics)

2007-08

Lecturer: Dr. Vladimir Dotsenko

Requirements/prerequisites:

Duration: First semester

Number of lectures per week: 3

Assessment:

End-of-year Examination: 2-hour examination

Description:

Further information about the course can be found at <http://www.maths.tcd.ie/~vdots/index426.html>

0. Examples of representations (trivial representation, regular representation).
1. Equivalent representations.
2. Arithmetic of representations.
3. Characters and matrix elements.
4. Irreducible representations. Schur's lemma.
5. Orthogonality relations for matrix elements and characters.
6. Applications.
 - (a) representations of a product of two groups;
 - (b) tensor powers of a faithful representation;
 - (c) dimensions of irreducibles divide the order of the group;
 - (d) Burnside's $p^a q^b$ -theorem.
7. "Maybe" topics.
 - (a) induced representations;
 - (b) representations of symmetric groups (basics);
 - (c) Schur-Weyl duality;
 - (d) Hurwitz's theorem on composition algebras.