Representation Theory of Groups - Blatt 5

11:30-12:15, Seminarraum 9, Oskar-Morgenstern-Platz 1, 2.Stock

http://www.mat.univie.ac.at/~gagt/rep_theory2017

Goulnara Arzhantseva
goulnara.arzhantseva@univie.ac.at

Martin Finn-Sell
martin.finn-sell@univie.ac.at

This sheet has two repeats - we can discuss anything from the class but these are worth trying to do if you hadn't originally attempted them.

Question 1. Let $G = C_3 = \langle g \mid g^3 = 1 \rangle$ be the cyclic group of order 3. Let V be the 2 dimensional vector space on the letters v_1 and v_2. Let G act on V by extending the following formulae linearly:

$$\rho(g)(v_1) = v_2, \rho(g)(v_2) = -(v_1 + v_2).$$

a) Show that ρ defines a representation of G on V;

b) Express V as a sum of G-stable irreducible subspaces.

Question 2. Let G be a group and H a subgroup of G. Show that any irreducible representation of G is contained in some induced irreducible representation of H.

Question 3. Let G be a group and $\pi : G \to GL(V)$ an irreducible representation. Is the dual representation π^* always irreducible?