

Math 751 – Fall 2020
Equivariant homotopy and cohomology
Worksheet 2

1. Show that $\rho_{C_2} \otimes \rho_{C_2} \cong 2\rho_{C_2}$.

2. Let V and W be n -dimensional G -representations.

(a) Show that V is isomorphic to W if and only if the homomorphisms

$$a_V, a_W: G \rightrightarrows \mathrm{GL}_n(\mathbb{R})$$

are conjugate.

(b) Let $p: G \twoheadrightarrow Q$ be surjective. Show that the pullback homomorphism

$$p^*: RO(Q) \longrightarrow RO(G)$$

is injective.

3. Recall that $RO(K_4) \cong \mathbb{Z}\{\mathbf{1}, p_1^*(\sigma), m^*(\sigma), p_2^*(\sigma)\}$. Determine the restriction homomorphisms $RO(K_4) \longrightarrow RO(C_2)$, for the three subgroups L (left), D (diagonal), and R (right) of order two.

4. For groups H and G , let $p_G: G \times H \longrightarrow G$ and $p_H: G \times H \longrightarrow H$ be the projections. Show that

$$\rho_{G \times H} \cong p_G^*(\rho_G) \otimes p_H^*(\rho_H).$$