

MA8403 Week 9

Drew Heard (drew.k.heard@ntnu.no)

October 23, 2023

1. Question 1

Let $G = C_2$ and consider the G -space $X = S^1 \wedge (EC_2)_+$, where C_2 acts trivially on S^1 and EC_2 is as defined in our discussions on Borel equivariant cohomology. Show that the homotopy groups $\pi_1(X^{C_2})$ and $\pi_1(X^e)$ together cannot have the structure of a C_2 -Mackey functor.

2. Question 2

Show that

$$\tilde{E}\mathcal{F}^K \simeq \begin{cases} S^0 & \text{if } K \notin \mathcal{F} \\ * & \text{otherwise.} \end{cases}$$

3. Question 3

Let \mathcal{F}_1 and \mathcal{F}_2 be families of subgroups of G . Show that:

1. $\mathcal{F}_1 \cap \mathcal{F}_2$ is a family, and $E(\mathcal{F}_1 \cap \mathcal{F}_2) \simeq E\mathcal{F}_1 \times E\mathcal{F}_2$.
2. $\mathcal{F}_1 \cup \mathcal{F}_2$ is a family and $\tilde{E}(\mathcal{F}_1 \cup \mathcal{F}_2) \simeq \tilde{E}\mathcal{F}_1 \times \tilde{E}\mathcal{F}_2$.

4. Question 4

Show that

$$(\text{Coind}_H^G(-))^G \simeq (-)^H \quad \text{and} \quad \Phi^G(\text{Ind}_H^G(-)) \simeq 0 \text{ for } H \neq G$$