

EXERCISES FOR TOPOLOGY III, WS05/06

Sheet 10, December 22th 2005

Solutions due on Thursday, 12th of January.

Exercise 10.1. Show that the dual of a Hopf-algebra of finite type over a field F is a Hopf-algebra

Exercise 10.2. Show that $\mathbb{R}P^\infty$ and $\mathbb{C}P^\infty$ are associative and commutative H -spaces.

Hint: represent an element of $\mathbb{K}P^\infty$ by a non-zero polynomial and use multiplication of polynomials.

Exercise 10.3. Compute the Pontrjagin product on the groups $H_*(\mathbb{R}P^\infty; \mathbb{F}_2)$ and for $H_*(\mathbb{C}P^\infty; \mathbb{Z})$.

Exercise 10.4. Compute the Pontrjagin product of $H_*(T^n; \mathbb{Z})$, where T^n is the topological group $S^1 \times \cdots \times S^1$ (n -factors).

Joyeux Noël et bonne année 2006 !