



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN

MATHEMATISCHES INSTITUT



Summer term 2017

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Topology II

Sheet 10

Exercise 1. Show that the signature $\sigma(M)$ is congruent mod 2 to the Euler characteristic $\chi(M)$ for any compact connected oriented manifold M .

Exercise 2. Given two compact connected oriented manifolds M and N of dimension $4n$, show that if $M \geq N$ then $b_{2n}(M) - |\sigma(M)| \geq b_{2n}(N) - |\sigma(N)|$.

Exercise 3. Prove that there exists no orientation reversing homotopy equivalence $h : \mathbb{C}P^{2n} \rightarrow \mathbb{C}P^{2n}$ without making use of the signature.

Exercise 4. Show that if a map $f : M \rightarrow N$ between compact connected oriented manifolds extends continuously to $F : W \rightarrow N$, where W is a compact connected oriented manifold with $\partial W = M$, then $\deg(f) = 0$.

Hand in: Tuesday, July 18th, during the exercise class.