

MAT 566: Differential Topology

Presentation: Hirzebruch Signature Theorem (after Multiplicative Sequences)

You should define the signature of a closed oriented topological $4k$ -manifold, give some basic examples (such as S^{4n} and $\mathbb{C}P^{2n}$), show that the signature is a well-defined homomorphism on the oriented cobordism ring modulo torsion, state the Signature Theorem, show what it says in dimensions 4 and 8, deduce it from the knowledge of the oriented cobordism ring modulo torsion, and show that the dimension 4 case implies that S^4 admits no almost complex structure (the dimension 8 case will be used in the next presentation on *Exotic Smooth Structures on S^7*). All of this except for the last part is in Section 19 of M&S. If time permits, give a Hodge theoretic interpretation of the signature in the smooth case; this is in *Spin Geometry*.