SEMINAR ON "CHARACTERISTIC CLASSES"
TUE 15:15–16:45, SUMMER TERM 2015

JUN.-PROF. WOLFGANG STEIMLE

Characteristic classes are cohomological invariants of a manifold, or rather, of its tangent bundle. In an intuitive sense, they measure the extent to which the tangent bundle is "twisted" or "non-trivial".

Some of these classes have a rather concrete geometric interpretation: For instance, the first Stiefel-Whitney class $w_1 \in H^1(M; \mathbb{Z}/2)$ of a manifold M is zero if and only if M is orientable. Other characteristic classes are linked to fundamental invariants of the underlying manifold, such as the Euler characteristic or the signature. Interestingly many characteristic classes can be explicitly computed in terms of a chosen Riemannian metric, even though the class itself is independent of the metric. This provides connections between topology and Riemannian geometry.

In total characteristic classes provide an excellent computational tool in the study of smooth manifolds and their bundles.

The goal of the seminar is to give an introduction to this topic. It will be based on the beautiful book "Characteristic Classes" by Milnor–Stasheff.

The seminar language will be English.

Prerequisites. We expect that the participants are familiar with the notion of a smooth manifold and have at least some acquaintance with homology or cohomology. Feel free to contact me if you feel uncertain about the prerequisites.

Organizational meeting. The organisational meeting takes place at the beginning of the first seminar slot (April 7).

Scheinvoraussetzungen. Aktive Teilnahme und Halten eines gelungenen Vortrags.

E-mail address: steimle@math.uni-leipzig.de
URL: http://www.math.uni-leipzig.de/people/steimle