- Title of the course: Clifford algebras and spin groups.
- Tentative outline: Clifford algebras (named after the English mathematician William Clifford) and spin groups have various important applications in mathematics and theoretical physics (as well as in digital image processing). From algebraic point of view, Clifford algebras generalize real numbers, complex numbers and quaternions. The theory of these algebras is connected with the theory of quadratic forms and orthogonal transformations. The spin group Spin(n) is the double cover of the special orthogonal group SO(n) and is often constructed as a subgroup of the invertible elements of the Clifford algebra associated with the space R^n endowed with the quadratic form $-x_1^2 - \cdots - x_n^2$.
- Objectives of the course: The purpose of the course is to present basic facts about Clifford algebras, spin groups, spin representations and Dirac spinors. The notions of tensor and exterior products of vector spaces will briefly be recalled. Auxiliary material about topological groups and covering space will also be given. In order to cover the whole programme, the course will be continued in the Spring term of the academic year 2018/2019.
- Prerequisites: Standard facts about vector spaces, linear maps and multilinear forms.
- Major references:
  1. T. Bröcker, T. tom Dieck, Representations of compact Lie groups (Chapter 1, § 6);
  2. T. Friedrich, Dirac operators in Riemannian geometry (Chapter 1);
  3. T. Husain, Introduction to topological groups (Chapter II, § 12, Chapter IV, §§ 26, 27);
  4. H. B. Lawson, M.-L. Michelson, Spin geometry (Chapter 1, §§ 1-6);
  5. E. L. Lima, Fundamental groups and covering spaces (§§ 6.1, 6.2, 7.1-7.3)

  Remark. These books can freely be downloaded from the net.
- Proposed schedule (classes per week): 2 lectures per week, each of 2 academic hours.