Seminar
Differential and Algebraic Topology

Thursday and Friday October/November 2019

Bratislava and Brno

The aim of the seminar is to understand that algebraic K-theory of a ring R is an infinite loop space. During the process we will learn in general about infinite loop spaces, simplicial sets and nerves of categories. Ultimately we will prove the statement by showing that $+ = \mathcal{Q}$ with the Quillen $\mathcal{Q}$-construction.

We plan to follow mainly Chapter 3 of the book [Wei13]. Perhaps occasional look into [Ros94], Srinivas or [Wal85].

Topics:

- $K_n(R)$ for $n \geq 2$ - various constructions: +-construction, group completion, Q-construction
- the spectrum $\mathbf{K}(R)$

Talks

(1) $K_0(R, I)$ ..... Lukáš Vokřínek
22.02.2019 [Ros94, 1.5]

(2) **Wall finiteness obstruction** ..... Tibor Macko
22.02.2019 [Ros94, 1.7]

(3) $K_1(R)$ **definition** ..... Tomáš Rusin
08.03.2019 [Ros94, 2.1]

(4) $K_1(R)$ **for division rings and local rings** ..... Martin Čadek
08.03.2019 [Ros94, 2.2]

(5) $K_1(R)$ **for PIDs and Dedekind domains** ... Pavel Chalmovianský
22.03.2019 [Ros94, 2.3]

(6) **Whitehead groups and Whitehead torsion** ..... L'udovít Balko
22.03.2019 [Ros94, 2.4]

Literatúra

[Coh73] Marshall M. Cohen. *A course in simple-homotopy theory*. Springer-Verlag, New York, 1973. Graduate Texts in Mathematics, Vol. 10.

[Ros94] Jonathan Rosenberg. *Algebraic K-theory and its applications*. Springer-Verlag, New York, 1994.

[Wal85] Friedhelm Waldhausen. Algebraic K-theory of spaces. In *Algebraic and geometric topology (New Brunswick, N.J., 1983)*, pages 318–419. Springer-Verlag, Berlin, 1985.

[Wei13] Charles A. Weibel. *The K-book*, volume 145 of *Graduate Studies in Mathematics*. American Mathematical Society, Providence, RI, 2013. An introduction to algebraic K-theory.