Seminar
Higher Algebraic K-theory

17.10.-18.10.2019 or 14.11.-15.11.2019 (Thursday and Friday)

Bratislava or Brno

The aim of the seminar is to understand various definitions of higher algebraic K-theory groups $K_n(R)$ where $n \geq 2$ of a ring R, and understand that there exists an infinite loop space $\mathbf{K}(R)$ such that $\pi_n(\mathbf{K}(R)) = K_n(R)$ for all n. This has important applications in topology, perhaps we touch some of them. However, more importantly we will learn some of the technology needed to show that a particular space is an (infinite) loop space which is an important topic of its own, occurring at many places in topology. We will also learn about simplicial sets and the celebrated Theorems A and B of Quillen.

We plan to follow mainly Chapter IV of the book [Wei13]. Other useful references might be [Ros94], [Ada78].

Talks

(1) **The definition $K_n(R) = \pi_n\mathbf{BGL}(R)^+$** .... Tibor Macko
    17.10.2019 [Wei13, IV.1]

(2) **Geometric realization of a small category** .... Tibor Macko
    17.10.2019 [Wei13, IV.3]

(3) **Symmetric monoidal categories I** .... Mária Šimková
    17.10.2019 [Wei13, IV.4] up to the end of page 331

(4) **Symmetric monoidal categories II** .... Martin Čadek
    18.10.2019 [Wei13, IV.4] from page 332 onwards

(5) **Quillen's Q-construction for exact categories** .... Tomáš Rusin
    18.10.2019 [Wei13, IV.6]

(6) **The "$+ = Q$" theorem** .... Lukáš Vokřínek?
    18.10.2019 [Wei13, IV.7]

REFERENCES

[Ada78] John Frank Adams. *Infinite loop spaces*. Princeton University Press, Princeton, N.J., 1978.

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

[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.