PROGRAM FOR THE TRANSCONTINENTAL SEMINAR ON CONTROLLED TOPOLOGY AND ASSEMBLY

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1. Introduction

The seventh edition of the Transcontinental Seminar analyzes the interaction of controlled topology and assembly maps. The seminar will be organized in the following thematic blocks:

(i) Algebraic K theory and Nil Phenomena. The Purpose of this block is to give a general introduction to algebraic K-theory and describe some relations and motivation coming from geometric topology. Another aim is the description of Waldhausen nil groups.
- Algebraic K-Theory and its relation with Topology: In this talk we make a review of K_0, K_1 and Whitehead group from an algebraic point of view. We discuss the relation of these groups with problems arising in geometric Topology, in particular, we highlight the Wall finiteness obstruction, the Whitehead Torsion and the S-Cobordism Theorem. We end with a geometric definition of Nil-groups.
- Waldhausen splitting theorem: In this talk we link Twisted Polynomial Extension Categories and the definition of Waldhausen Nil-groups in order to settle down the Waldhausen splitting theorem. We finish this talk by presenting some known results on Nil-groups. [4], [2]

(ii) Homotopy colimits and homotopy theoretical characterization of Assembly. This block will deal with a description of homotopy colimits [1] and its relation to Assembly maps, in the sense of Weiss and Williams. [5]

(iii) Controlled topology and the assembly map: In this block we will recall the definition of the controlled Whitehead group, the thin h-cobordism theorem, and some other controlled-type theorems. Using this controlled approach we will show a proof of the Farrell-Jones conjecture for finitely generated free groups. [3]

References

[1] A. K. Bousfield and D. M. Kan. *Homotopy limits, completions and localizations*. Lecture Notes in Mathematics, Vol. 304. Springer-Verlag, Berlin, 1972.

[2] D. Juan-Pineda and S. Prassidis. On the nil groups of Waldhausen nils. *Topology Appl.*, 146/147:489–499, 2005.

[3] S. Prassidis. Introduction to controlled topology and its applications. In *Cohomology of groups and algebraic K-theory*, volume 12 of *Adv. Lect. Math. (ALM)*, pages 343–385. Int. Press, Somerville, MA, 2010.

[4] F. Waldhausen. Algebraic K-theory of generalized free products. I, II. *Ann. of Math. (2)*, 108(1):135–204, 1978.

[5] M. Weiss and B. Williams. Assembly. In *Novikov conjectures, index theorems and rigidity, Vol. 2 (Oberwolfach, 1993)*, volume 227 of *London Math. Soc. Lecture Note Ser.*, pages 332–352. Cambridge Univ. Press, Cambridge, 1995.

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