

SEMINÁRIO DE TEORIA DA COMPUTAÇÃO

Computations, Paths, Types and Proofs

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Sala: MAT A - térreo do MAT

Abstract. Computations, Paths, Types and Proofs What is a proof of an equality statement? In what sense can it be seen as a homotopy? Motivated by looking at equalities in type theory as arising from the existence of computational paths between two formal objects, it seems useful to review the role and the power of the notion of propositional equality as formalised in the so-called Curry-Howard functional interpretation. In a recent series of applications of such a connection between type theory and homotopy theory, we use a formalization of computational path to obtain some results of algebraic topology and, with support of the Seifert-Van Kampen Theorem, we show how to calculate the fundamental group of Klein bottle, the torus, and two-holed torus. As a matter of fact, this shows that a single concept may serve as a bridging bond between several areas of mathematics: path. Computation: convertibility between λ -terms. (Algebraic) Topology: homotopy theory. Logic: proofs of equality. (Higher) Categories: polycategories; (Higher) Algebra: ∞ -groupoids.