

Algebra, Combinatorics and Number Theory Seminar

Date. Friday, May 20, 2022 - 5pm (GMT+1) ¹

Speaker. Nicolau Saldanha - PUC Rio de Janeiro

Title. Domino tilings in dimension 3

Abstract. In dimension 2, a domino is a 2×1 rectangle. Domino tilings of quadriculated regions have been extensively studied, with several deep and famous results.

The corresponding problems in dimension 3 (or higher) appear to be almost without exception much harder.

In dimension 2, it is known, for instance, that for any quadriculated disk any two tilings can be joined by a finite sequence of flips: a flip consists in lifting two adjacent dominos and placing them back after a quarter turn rotation.

In dimension 3, flips are not sufficient to join any two tilings of a box. Indeed, there exist a few tilings which admit no flip. Also, there exists an invariant under flips which assumes integer values, the twist.

Under suitable hypothesis, we prove that it is almost always true that two tilings with the same twist can be joined by flips.

This talk includes joint work with several collaborators, including J. Freire, C. Klivens, P. Milet and C. Tomei. The first result in this area, in dimension 2, is due to W. Thurston.

¹<https://videoconf-colibri.zoom.us/j/82635615891>