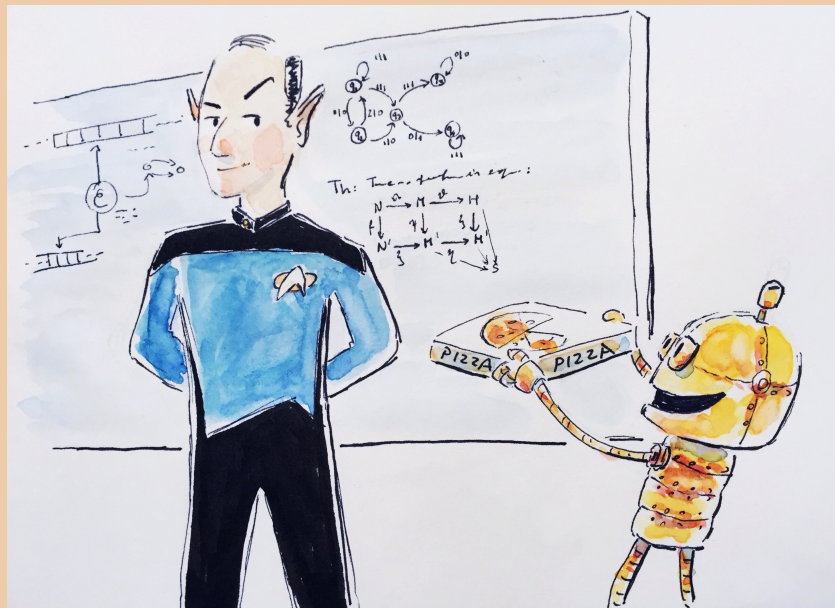


C'era una volta in Porto...

...arrivederci Emanuele Rodaro!



14.00 - 14.25: **Francesco Matucci** (State Univ. Campinas)

The wrath of $2V$, the final frontier

ABSTRACT: In a bold attempt to go where no man has gone before, we embark on a journey of discovery about Thompson groups V and $2V$. We recall relevant definitions and results about V , a group acting on the Cantor set, and we define graphs which encode information about centralizers and dynamics of elements. We then move to $2V$, a group acting on the Cantor square with chaotic dynamics and undecidable torsion problem, and see what can be adapted. As a wise man once said, “He who controls $2V$ controls the universe”. (this is joint work with James Belk, Conchita Martinez-Perez and Brita-Nucinkis)

14.30 - 14.55: **Rogério Reis** (Univ. Porto)

Death Star operational complexity: Lord Vader's revenge

ABSTRACT: Two language operations that can be expressed by suitable combining complement with concatenation and star, respectively, are introduced. The state complexity of those operations on regular languages is investigated. In the deterministic case, optimal exponential state gaps are proved for both operations. In the nondeterministic case, for one operation an optimal exponential gap is also proved, while for the other operation an exponential upper bound is obtained.

15.00 - 15.25: **Pedro Silva** (Univ. Porto)

Close encounters of the third rank

ABSTRACT: It is well known that any matroid (viewed as a simplicial complex) is homotopically equivalent to a wedge of spheres. In collaboration with Stuart Margolis and John Rhodes, we have proved that this result can be extended to boolean representable simplicial complexes of rank at most 3. But the topology in rank 3 has its mysteries...

15.30 - 15.55: **Hossein Shahzamanian** (Univ. Porto)

Gone with the variants of nilpotent pseudovarieties

ABSTRACT: In this talk, we investigate the rank of classes defined by several of the variants of nilpotent semigroups in the sense of Mal'cev. For several of them, we even give finite basis of pseudoidentities. We show that the pseudovariety NT has infinite rank and, therefore, it is non-finitely based. Finally, we give a complete comparison diagram of them.

16.00 - 16.25: **Jorge Almeida** (Univ. Porto)

Towards a more balanced universe: solving inequality problems

ABSTRACT: The problem considered in this talk is whether an inequality of omega-terms is valid in a given level of a concatenation hierarchy of star-free languages, such as the extensively studied Straubing-Thérien hierarchy, which has significant connections with finite model theory. The main result shows that the problem is decidable for all levels of that particular hierarchy. This is joint work with Ondrej Klíma and Michal Kunc.

16.30 - 17.00: Coffee break

17.00 - 17.25: **José Carlos Costa** (Univ. Minho)

*Twins **AInv** and **ACom**, not only Higgins and Margolis can tell them apart*

ABSTRACT: An inverse semigroup is a regular semigroup whose idempotents commute. In the early 1990's, Ash proved that the pseudovariety generated by finite inverse semigroups is precisely the pseudovariety **ECom** of idempotent commuting semigroups. Let **AInv** be the pseudovariety generated by finite aperiodic (i.e., group free) inverse semigroups and let **ACom** be the pseudovariety of aperiodic semigroups with commuting idempotents. Surprisingly, Higgins and Margolis have shown that these pseudovarieties are not equal. They did it by exhibiting a certain finite aperiodic semigroup with commuting idempotents and by showing that it does not divide any finite aperiodic inverse semigroup.

In this talk we will present a new proof of the above result by showing that the pseudovarieties **AInv** and **ACom** do not satisfy the same pseudoidentities. For this we study the word problems for ω -terms (formal expressions obtained from letters of an alphabet using only the operations of multiplication and ω -power) over each of these pseudovarieties. It is shown that both problems are decidable and have different solutions. This is joint work with Mário Branco (FCUL).

17.30 - 17.55: **Alfredo Costa** (Univ. Coimbra)

Bringing balance to the galaxy of pseudovarieties: equidivisibility

ABSTRACT: We study the classification of pseudovarieties whose corresponding relatively free profinite semigroups are equidivisible. This is joint work with Jorge Almeida.

18.00 - 18.50: **Emanuele Rodaro** (Univ. Porto)

Boundary action of automaton groups without singular points and Wang tilings

ABSTRACT: We consider automaton groups without singular points, that is, points in the boundary for which the map, that associates to each point the corresponding stabilizer, is not continuous. This is motivated by the problem of finding examples of infinite bireversible automaton groups with only trivial stabilizers in the boundary, raised by Grigorchuk and Savchuk. We show that, in general, the set of singular points has measure zero. Then we focus our attention on several classes of automata. We characterize those contracting automata generating groups without singular points, and we show that the Basilica group has no singular points. We prove that potential

examples of reversible automata generating infinite groups without singular points are necessarily bireversible. Then we provide some necessary conditions for such examples to exist, and we study some dynamical properties of their Schreier graphs in the boundary. Finally we relate some of those automata with aperiodic tilings of the discrete plane via Wang tilings. This fact has a series of consequences from the algorithmic and dynamical points of view, and it is related to a problem raised by Gromov regarding the searching for examples of CAT(0) complexes whose fundamental groups are not hyperbolic and contain no subgroup isomorphic to \mathbb{Z}^2 .

20.00 - 22.00: Dinner (Café & Meio, Matosinhos)

Date: Friday, 15th January 2016

The talks will take place at Room FC1.029, Department of Mathematics, Faculty of Sciences, University of Porto

Details on the dinner program will soon be available at this website. Anyone wishing to participate is asked to send an email as soon as possible to pvsilva@fc.up.pt.