



# Ph.D. in Mathematics and Computer Science

Academic year 2023/2024



## TOPICS IN PDES

### Symmetry results for semilinear elliptic PDEs

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The aim of this course is to study qualitative properties of solutions of some semilinear elliptic equations. Symmetry and monotonicity remain important topics in the modern theory of nonlinear partial differential equations. The moving planes method is one of the most important techniques that have been used in recent years to establish some qualitative properties of positive solutions of nonlinear elliptic equations such as symmetry and monotonicity; in particular, it traces back to the seminal papers of A. D. Alexandrov and J. Serrin. In this technique, maximum and comparison principles play a crucial role. Many well-known results about classical and more recent versions of maximum and comparison principles, as well as Hopf's Lemma, will be presented.

In the first part of the course, we will focus our attention on the case of bounded domains (problems under Dirichlet boundary conditions and overdetermined problems).

In the second part, we will present a classification result for a doubly critical semilinear elliptic equation in the whole space  $\mathbb{R}^n$ , borrowing a new approach.



**MON 18/03**

**MON 25/03**

**TUE 19/03**

**TUE 26/03**

**WED 20/03**

**WED 27/03**



**9:30 - 11:30**



**AULA MT 12**

**CUBO 30 B - 2ND FLOOR**