



Departmental PhD Thesis Exam

Thursday, August 22nd, 2024, at 9:00 a.m. (sharp)
via Zoom / BA6183

PhD Candidate : Mariam Al-Hawaj

Supervisor : Giulio Tiozzo

Thesis title : Generalized pseudo-Anosov maps from holomorphic dynamics



Abstract

In this thesis, we develop a new connection between the dynamics of quadratic polynomials on the complex plane and the dynamics of homeomorphisms of surfaces. In particular, given a quadratic polynomial, we investigate whether one can construct an extension of it which is a generalized pseudo-Anosov homeomorphism. Generalized pseudo-Anosov means it preserves a pair of foliations with infinitely many singularities that accumulate on finitely many points. We determine for which quadratic polynomials such an extension exists. The construction is related to the dynamics on the Hubbard tree, which is a forward invariant subset of the filled Julia set containing the critical orbit. We define a type of Hubbard trees, which we call crossing-free, and show that these are precisely the Hubbard trees for which one can construct a generalized pseudo-Anosov map.