

Invariant Theory and the graph reconstruction conjecture

Emilie Dufresne

The Graph Reconstruction Conjecture is a long-standing problem in Graph Theory formulated by Kelly (1957) and Ulam (1960). The conjecture states that every graph with at least three vertices can be uniquely reconstructed (up to isomorphism) from their deck of one-vertex deleted subgraphs. It is well known that the graph isomorphism problem can be worded using Invariant Theory, although this is not particularly interesting in practice as the computations get quickly out of hand. In this talk, we explore how invariant theory can be used to approach the Graph Reconstruction conjecture. This naturally brings the focus to K -weighted graphs. We discuss the attempt by Thiéry (2000), which led to a disproof of a stronger statement using a computational argument. This approach turns out not to be particularly practical computationally, but we'll see how it still brings valuable insight. This talk is based on a survey paper joint with Gabriela Jerónimo, Jenny Kenkel, Haydee Lindo and Nelly Villamizar.