

Algorithmic aspects related to the structure of lifted groups along covering projections

Aleksander Malnič

University of Ljubljana, Ljubljana, Slovenia

University of Primorska, Koper, Slovenia

aleksander.malnic@guest.arnes.si

(joint work with Rok Požar)

A large part of algebraic graph theory is devoted to analyzing structural properties of graphs with prescribed degree of symmetry in order to classify, enumerate, construct infinite families, and to produce catalogs of particular classes of interesting graphs up to a certain reasonable size. It is not surprising, then, that the techniques employed in these studies are fairly diverse, ranging from pure combinatorial and computational methods to methods from abstract group theory, permutation groups, combinatorial group theory, linear algebra, representation theory, and algebraic topology.

Covering space techniques, and lifting groups of automorphisms along regular covering projections in particular, play a prominent role in this context. A systematic combinatorial treatment of lifting automorphisms has been considered by several authors, yet several important issues still remain to be considered. In view of the fact that structural properties of graphs often rely on the structure and the action of their automorphism groups, one such topic is investigating the structure of lifted groups. Other points of interest are algorithmic and complexity aspects of lifting automorphisms, which have so far received even less attention.

In the talk I will review some recent results along these lines.