Thomas Zaslavsky (Binghamton)

Switching Automorphism Groups of Signed Petersen Graphs

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Automorphism groups of graphs have interested algebraists, as representing groups in a relatively simple way, and graph theorists, as describing the symmetries of graphs. The Petersen graph, a ten-vertex graph that plays many roles in graph theory, has a remarkably large automorphism group for its size: the symmetric group on five letters.

A *signed Petersen graph* is the Petersen graph with arbitrary signs on the edges. There are six essentially different ways to choose the signs, up to vertex switching, in which the signs of all edges at some vertex are reversed, and sign-preserving graph automorphism. A *switching automorphism* of a signed graph is a combination of vertex switchings and graph automorphisms whose result is the original signed graph. The six essentially different signatures of the Petersen graph have six different switching automorphism groups, of which some are trivial but two, although isomorphic to well known groups, have their own rich internal structure.

I will describe these groups. It will take time.
