On edge-transitive dihedrants

Luka Šinkovec

University of Primorska (Slovenia)

(Joint work with I. Kovács)

Let Γ be a Cayley graph over a dihedral group D_{2n} (a dihedrant for short) and G be the group of automorphisms of Γ acting transitively on the edges of Γ. The problem of classifying such graphs was proposed by Song et al. [5]. It is currently solved only under additional assumptions on Γ or G, see [1, 2, 3, 4]. In this talk, we introduce two new infinite families of edge-transitive dihedrants and show that the graph Γ is either described in the earlier papers, belongs to one of the two new families, or the group G satisfies certain conditions. Using these conditions, we also classify Γ in the case when G is a solvable group. This generalizes a result of Pan et al. [4] dealing with the case where $D_{2n} \leqslant G$ and D_{2n} is normal in G.

References

[1] S. F. Du, A. Malnič, and D. Marušič, Classification of 2-arc-transitive dihedrants, J. Combin. Theory Ser. B 98 (2008), 1349–13472.

[2] J.-J. Huang, Y.-Q. Feng, J.-X. Zhou, F.-G. Yin, The classification of two-distance transitive dihedrants, J. Algebra 667 (2025), 508–529.

[3] I. Kovács, Arc-transitive dihedrants of odd prime power order, Graphs Combin. 29 (2013), 569–583.

[4] J. Pan, X. Yu, H. Zhang, Z. Huang, Finite edge-transitive dihedrant graphs, Discrete Math. 312 (2012), 1006–1012.

[5] S. J. Song, C. H. Li, and H. Zhang, Finite permutation groups with a regular dihedral subgroup, and edge-transitive dihedrants, J. Algebra 399 (2014), 948–959.