

Abstract

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Relations and bounds for the zeros of graph polynomials using vertex orbits.

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In this paper, we prove bounds for the unique, positive zero of $O^*_G(z) := 1 - O_G(z)$, where $O_G(z)$ is the so-called orbit polynomial [1]. The orbit polynomial is based on the multiplicity and cardinalities of the vertex orbits of a graph. In [1], we have shown that the unique, positive zero $\delta \leq 1$ of $O^*_G(z)$ can serve as a meaningful measure of graph symmetry. In this paper, we study special graph classes with a specified number of orbits and obtain bounds on the value of δ .

[1] M. Dehmer, Z. Chen, F. Emmert-Streib, A. Mowshowitz, K. Varmuza, L. Feng, H. Jodlbauer, Y. Shi, J. Tao, The orbit-polynomial: a novel measure of symmetry in networks, *IEEE Access* 8 (2020) 36100–36112, doi: 10.1109/ACCESS.2020.2970059 .