The edge-bandwidth of Hamming graphs

Zevi Miller
Miami University

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Abstract

The edge-bandwidth $B'(G)$ of a graph G is the bandwidth of the line graph of G. The Hamming graph K_n^d is the d-fold Cartesian product of the complete graph K_n. We obtain lower and upper bounds on the edge-bandwidth of the Hamming graph. For fixed even n, our lower and upper bounds match asymptotically as functions of d, showing that

$$B'(K_n^d) \sim \sqrt{\frac{d}{2\pi}} \cdot n^d \cdot (n-1).$$

This extends a recent result of Balogh, Mubayi, and Pluhár that $B'(K_2^d) \sim \sqrt{\frac{d}{2\pi}} \cdot 2^d$.

If time allows, we will also discuss the edge-bandwidth of the mutli-dimensional grids P_n^d. For every fixed d, we determine $B'(P_n^d)$ asymptotically as a function of n, showing that

$$B'(P_n^d) \sim c_d \cdot n^{d-1},$$

where c_d is a constant depending solely on d. For instance, $c_2 = 2$ and $c_3 = \frac{9}{4}$, and so on. This extends a result of Balogh, Mubayi, and Pluhár that $B'(P_n^2) \sim 2n$.

The results presented in this talk are joint with Reza Akhtar and Tao Jiang.