Abstract

Spread Function on Graphs

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Let $\Gamma(G, d)$ denote the set of all mappings from the vertex set, $V(G)$ of a graph G into $\mathbb{R}^d$, for any positive integer d. We define the *spread function* to be

$$g(G, d) = \inf_{\alpha \in \Gamma(G,d)} \frac{\max_{x \sim y} |\alpha(x) - \alpha(y)|}{\min_{x \sim y} |\alpha(x) - \alpha(y)|}.$$

An alternate definition is derived by limiting our set of mappings to $\Phi(G, d)$, which denotes the set of all mappings $\phi : V(G) \to \mathbb{R}^d$ such that for any two adjacent vertices $x \sim y$, the minimum distance is at least 1. In this work, we consider the mappings of graphs into different dimensions and seek to investigate the value of the spread function for the graphs. We implored the use of colorability of graphs to derive theorems that led to faster results.

Keywords: metric mappings, embeddings, graph coloring, chromatic number