Local Rainbow Colorings

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Abstract

Given a graph H, we denote by $C(n, H)$ the minimum number k such that following holds: There are n colorings of $E(K_n)$ with k-colors, each associated with one of the vertices of K_n, such that for every copy T of H in K_n, at least one of the colorings that are associated with $V(T)$ assigns distinct colors to all the edges of $E(T)$.

We characterize the set of all graphs H for which $C(n, H)$ is bounded by some absolute constant $c(H)$, prove a general upper bound and obtain lower and upper bounds for several graphs of special interest. A special case of our results partially answers an extremal question of Karchmer and Wigderson motivated by the investigation of the computational power of span programs.

Joint work with Noga Alon.