THE STAR B-CHROMATIC NUMBER OF A GRAPH

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The b-chromatic number $\chi_b(G)$ of a graph G was introduced by Irving and Manlove [2] in 1999 and is well investigated graph invariant by now. Recently Anholcer et al. [1] in 2022 generalized it to the acyclic b-chromatic number $A_b(G)$ for acyclic colorings of G. We continue with generalization of b-chromatic number to some special colorings, this time in particular to star colorings and we introduce the star b-chromatic number $S_b(G)$ of a graph G.

A star coloring of a graph G is a proper coloring where vertices of every two color classes induce a forest of stars. A strict partial order is defined on the set of all star colorings of G. We introduce, analogue to the b-chromatic number, the star b-chromatic number $S_b(G)$ as the maximum number of colors in a minimum element of the mention order. We present several combinatorial properties of $S_b(G)$, compute the exact value for $S_b(G)$ for several known families and compare $S_b(G)$ with several invariants naturally connected to $S_b(G)$.

References

[1] M. Anholcer, S. Cichacz, and I. Peterin, On b-acyclic chromatic number of a graph. Computational and Applied Mathematics 42(1) (2023), #21.

[2] R. W. Irving and D. F. Manlove, The b-chromatic number of a graph. Discrete Applied Mathematics 91 (1999), 127–141.