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Erdős, Paul; Gyárfás, A.; Pyber, L.
Vertex coverings by monochromatic cycles and trees. (In English)
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A. Gyárfás [Irregularities of partitions, Pap. Meet., Fertod/Hung. 1986, Algorithms Comb. 8, 89-91 (1989; Zbl 736.05062)] conjectured that if the edges of a complete graph K are colored with r colors then, for some function f, the vertex set of K can be covered by at most $f(r)$ vertex disjoint monochromatic paths. Allowing cycles to include single vertices and edges, the authors prove a stronger form of the conjecture: If the edges of a complete graph K are colored with r colors then the vertex set of K can be covered by at most $cr^2 \log r$ vertex disjoint monochromatic cycles. This result makes it possible to define, as a function of r, the minimum number of monochromatic cycles (or paths or trees) needed to cover (or partition) the vertex set of any r-colored complete graph. The authors conjecture that the cycle partition number is r and that the tree partition number is $r-1$ and prove these for the case $r=3$.

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Classification:
05C70 Factorization, etc.
05C38 Paths and cycles
05C05 Trees
05C15 Chromatic theory of graphs and maps

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vertex coverings; complete graph; monochromatic paths; monochromatic cycles; paths; trees; cycle partition number; tree partition number