Degrees and degree sequence of $k$-edge $d$-critical graphs

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Abstract

Let $k$ and $d$ be positive integers with $k \geq 2d$. Let $Z_k = \{0, 1, 2, ..., k - 1\}$ be the set of integers modulo $k$. Let $D_k(x,y) = \min\{|x - y|, k - |x - y|\}$ for $x,y \in Z_k$. A pseudo complete $d$-coloring of $G$ using $k$ colors is a mapping $\phi : V(G) \rightarrow Z_k$ such that for any two elements $i,j \in Z_k$ with $D_k(i,j) \geq d$, there exist adjacent vertices $u,v$ such that $\phi(u) = i$ and $\phi(v) = j$. The maximum value of $k$ for which $G$ is $k$-pseudo complete $d$-colorable is called the pseudo $d$-achromatic number of $G$ and is denoted by $\psi^d_s(G)$. A graph $G$ is called $k$-edge $d$-critical if $\psi^d_s(G) = k$ and $\psi^d_s(G - e) < k$ for all $e \in E(G)$. In this paper we present several basic results on the degrees and degree sequence of $k$-edge $d$-critical graphs.

Keywords: Star chromatic number, Pseudo complete $d$-coloring, Pseudo $d$-achromatic number, $k$-edge $d$-critical graph.

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