Characterization of Minimally $(2, l)$-Connected Graphs

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Abstract

For an integer $l \geq 2$, the l-connectivity $\kappa_l(G)$ of a graph G is defined to be the minimum number of vertices of G whose removal produces a disconnected graph with at least l components or a graph with fewer than l vertices. Let $k \geq 1$, a graph G is called (k, l)-connected if $\kappa_l(G) \geq k$. A graph G is called minimally (k, l)-connected if $\kappa_l(G) \geq k$ but $\forall e \in E(G)$, $\kappa_l(G - e) \leq k - 1$. We present a structural characterization for minimally $(2, l)$-connected graphs and classify extremal results. These extend former results by Dirac and Plummer on minimally (2,2)-connected graphs.