

## ABSTRACT

<b>Research Title</b>	On the minimum degree of $k_{\frac{1}{2}}$ -extendable graphs
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Let  $G$  be a simple connected graph on  $2n$  vertices with a perfect matching.  $G$  is  $k$ -extendable if for every set  $M$  of  $k$  independent edges, there exists a perfect matching in  $G$  containing all the edges of  $M$ . A simple connected graph  $G$  on  $2n + 1$  vertices is  $k_{\frac{1}{2}}$ -extendable if  $G - u$  is  $k$ -extendable for every vertex  $u$  of  $G$ . We say that  $G$  is minimally  $k_{\frac{1}{2}}$ -extendable if  $G$  is  $k_{\frac{1}{2}}$ -extendable but  $G - e$  is not  $k_{\frac{1}{2}}$ -extendable for every edge  $e$  of  $G$ . The problem that arises is that of characterizing  $k_{\frac{1}{2}}$ -extendable and minimally  $k_{\frac{1}{2}}$ -extendable graphs.  $k_{\frac{1}{2}}$ -extendable graphs have been studied recently by Yu[12] whilst minimally  $k_{\frac{1}{2}}$ -extendable graphs have not been studied. In this paper, we establish the spectrum of values for the minimum degree of a  $k_{\frac{1}{2}}$ -extendable graph. Further, we determine the set of realizable values for minimum degree of  $k_{\frac{1}{2}}$ -extendable graphs and complete characterization of  $k_{\frac{1}{2}}$ -extendable graphs are given for the case  $k = n - 1$  and  $n - 2$ . Moreover, we establish necessary and sufficient conditions for a  $k_{\frac{1}{2}}$ -extendable graph to be minimal. In addition, we obtain a complete characterization of minimally  $k_{\frac{1}{2}}$ -extendable graphs for  $k = n - 1$  and  $n - 2$ .