

# Minimal graphs containing $k$ perfect matchings

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Let  $G$  be a graph. An *odd subdivision* of a graph  $G$  is obtained by replacing every edge of  $G$  with a path of odd length connecting its endvertices, so that these paths are internally disjoint. The replacement paths may also be of length one, making a graph an odd subdivision of itself.

Assuming  $G'$  is an odd subdivision of  $G$  there exists a natural bijective correspondence between perfect matchings in  $G$  and those in  $G'$ .

A graph  $G$  is *minimally  $k$ -matchable* if it has at least  $k$  distinct perfect matchings but deleting an arbitrary edge results in a graph which has fewer than  $k$  perfect matchings.

Let  $k \geq 1$  be an integer. We show that there exists a *finite* set of graphs  $\mathcal{G}_k$  so that every minimally  $k$ -matchable graph is isomorphic to a disjoint union of an odd subdivision of some graph from  $\mathcal{G}_k$  and several copies of  $K_2$ .