

# THE SIZE-RAMSEY NUMBER OF POWERS OF BOUNDED DEGREE TREES

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ABSTRACT. Given a positive integer  $s$ , the  $s$ -colour size-Ramsey number of a graph  $H$  is the smallest integer  $m$  such that there exists a graph  $G$  with  $m$  edges with the property that, in any colouring of  $E(G)$  with  $s$  colours, there is a monochromatic copy of  $H$ . We prove that, for any positive integers  $k$  and  $s$ , the  $s$ -colour size-Ramsey number of the  $k$ th power of any  $n$ -vertex bounded degree tree is linear in  $n$ . As a corollary we obtain that the  $s$ -colour size-Ramsey number of  $n$ -vertex graphs with bounded treewidth and bounded degree is linear in  $n$ , which answers a question raised by Kamčev, Liebenau, Wood and Yepremyan [*The size Ramsey number of graphs with bounded treewidth*, arXiv:1906.09185 (2019)].

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