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On the extremal values of ratios of number of paths

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Abstract

In this paper, we analyze the ratios of the numbers of paths $p_i(G)$ and $p_j(G)$ of different length in graph G . Namely, we are interested in the extremal values of these ratios for acyclic and cyclic graphs with given maximal degree. The values of infimum and supremum for graphs with given maximal degree are obtained. Also, the infimum of these ratios for trees with given maximal degree are obtained. Suprema for trees of given maximal degree are given when ratios of paths of length 1 and 2 are observed, and when ratios of paths of lengths 1 and 3 are observed. As the main result, a linear algorithm (in terms of maximal degree) for finding suprema of the ratios of the numbers of paths of length 2 and 3 for trees with given maximal degree is presented.

Keywords: Extremal graph, path, push to leaves.

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O ekstremni vrednosti razmerij števila poti

Povzetek

V tem članku analiziramo razmerja med številoma poti $p_i(G)$ in $p_j(G)$ različnih dolžin grafa G . Zanimajo nas ekstremne vrednosti teh razmerij za aciklične in ciklične grafe z dano maksimalno stopnjo vozlišč. Določimo vrednosti infimuma in supremuma teh razmerij za grafe z dano maksimalno stopnjo. Določimo tudi infimum teh razmerij za drevesa z dano maksimalno stopnjo. Pri teh drevesih obravnavamo tudi supremum razmerij med števili poti dolžin 1 in 2 ali 1 in 3. Kot glavni rezultat predstavimo linearni algoritem (v smislu maksimalne stopnje), ki poišče supremum razmerij med števili poti dolžin 2 in 3 za drevesa z dano maksimalno stopnjo.

Ključne besede: Ekstremalni graf, pot, približevanje listom.