



SEMINARIUM MATEMATYKA DYSKRETNA

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MATCHING AND EDGE-CONNECTIVITY IN GRAPHS WITH GIVEN MAXIMUM DEGREE

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In this talk, we determine tight lower bound on the matching number of a graph with given maximum degree and edge-connectivity in terms of its order and size. For a graph G of order n , size m , matching number $\alpha'(G)$, edge-connectivity $\lambda(G) \geq \lambda \geq 1$ and maximum degree $k \geq \lambda$ we determine best possible constants $a_{k,\lambda}$, $b_{k,\lambda}$ and $c_{k,\lambda}$ (depending only on k and λ) such that $\alpha'(G) \geq a_{k,\lambda} \cdot n + b_{k,\lambda} \cdot m - c_{k,\lambda}$. Further if k and λ have different parities, we determine best possible constants $d_{k,\lambda}$, $e_{k,\lambda}$ and $f_{k,\lambda}$ (depending only on k and λ) such that $\alpha'(G) \geq d_{k,\lambda} \cdot m - e_{k,\lambda} \cdot n - f_{k,\lambda}$. We also show that $\alpha'(G) \geq n - \frac{1}{\lambda}m$ unless $\alpha'(G) = \frac{1}{2}(n-1)$ in which case $\alpha'(G) \geq n - \frac{1}{\lambda}m - \frac{1}{2}$. We prove that the above bounds are tight for essentially all densities of graphs. We show that these bounds are sufficient to give a complete description of the set $L_{k,\lambda}$ of pairs (γ, β) of real numbers such that $\alpha'(G) \geq \gamma n + \beta m$ for some constant K and for every connected graph G with maximum degree at most k and edge-connectivity at least $\lambda \geq 1$. We show that $L_{k,\lambda}$ is a convex set, and determine the extreme points.

Literatura

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- [4] Suil O and D. B. West, Matching and edge-connectivity in regular graphs. *European J. Comb.* **32** (2011), 324–329.