

Institut für Optimierung und Diskrete Mathematik

Vortrag im Seminar Diskrete Mathematik und Optimierung

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Seminarraum C208, Steyrergasse 30, 2. Stock

Finding Large Planar Subgraphs

OLIVER COOLEY

(TU Graz)

Given a graph G , we consider the problem of finding a planar subgraph H of G with many edges. Define the *planarity* $\text{pl}(G)$ of G to be $\max\{e(H)\}$ over all planar subgraphs $H \subseteq G$. Given integers n and d , let $\text{pl}(n, d)$ be $\min\{\text{pl}(G)\}$ over all graphs G on n vertices with minimum degree d .

In this talk we will examine the curious behaviour of $\text{pl}(n, d)$ when n is approximately $n/2$. Kühn, Osthus and Taraz showed that for $\Theta(n) = d \leq n/2$ we have $\text{pl}(n, d) = (2 + o(1))n$. In this talk we will outline a proof that

$$\begin{aligned}\text{pl}(n, (n+1)/2) &= (2.25 + o(1))n && \text{for } n \text{ even and} \\ \text{pl}(n, n/2 + 1) &= (2.5 + o(1))n && \text{for } n \text{ odd.}\end{aligned}$$

Thus the asymptotic behaviour of the parameter $\text{pl}(n, d)/n$ is to remain constant at 2 for some time before exhibiting two discrete jumps at $d = (n+1)/2$ and $d = n/2 + 1$.

This is based on joint work with Tomasz Łuczak, Anusch Taraz and Andreas Würfl.

Mihyun Kang