

Partitions of graphs with constraints on the maximum degree

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A **partition** of a (finite undirected simple) graph G is a sequence of induced subgraphs of G such that each vertex belongs to exactly one subgraph of the sequence. The lecture deals with the following conjecture:

Conjecture 1 *Let G be a graph with $\Delta(G) \leq d_1 + d_2 + \dots + d_p + (p - 2)$ with $p \geq 1$ and $d_1, d_2, \dots, d_p \in \mathbb{N}_0$. Then G has a partition (G_1, G_2, \dots, G_p) such that for every $i \in \{1, 2, \dots, p\}$ the following statements hold:*

- (a) $\Delta(G_i) \leq d_i$.
- (b) *If H is a d_i -regular component of G_i , then H is a K_{d_i+1} .*

I will present a proof of the above conjecture for the class of triangle-free graphs; this result has two interesting implications.