

# Stability version of Dirac's theorem and its applications for generalized Turán problems

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In 1952, Dirac proved that every 2-connected  $n$ -vertex graph with the minimum degree  $k + 1$  contains a cycle of length at least  $\min\{n, 2(k + 1)\}$ . Here we obtain a stability version of this result by characterizing those graphs with minimum degree  $k$  and circumference at most  $2k + 1$ .

We present applications of the above-stated result by obtaining generalized Turán numbers.

In particular, for all  $\ell \geq 5$  we determine how many copies of a five-cycle as well as four-cycle are necessary to guarantee that the graph has a circumference larger than  $\ell$ .

In addition, we give new proof of Luo's Theorem for cliques using our stability result.

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