

Robustness of graphs – case study: Dirac’s theorem

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A typical result in graph theory can be read as following: under certain conditions, a given graph G has some property \mathcal{P} . For example, a classical theorem of Dirac asserts that every n -vertex graph G of minimum degree at least $n/2$ is Hamiltonian, where a graph is called Hamiltonian if it contains a cycle that passes through every vertex of the graph. Recently, there has been a trend in extremal graph theory where one revisits such classical results, and attempts to see how strongly G possesses the property \mathcal{P} . In other words, the goal is to measure the robustness of G with respect to \mathcal{P} . In this talk, we discuss several measures that can be used to study robustness of graphs with respect to various properties. To illustrate these measures, we present three extensions of Dirac’s theorem.