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DiMaS

Seminář diskrétní matematiky

Katedra aplikované matematiky & JČMF

Conditions for adding vertices to (k, g) -graphs

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A (k, g) -graph is a k -regular graph of girth g . A (k, g) -graph of the smallest possible order is called a (k, g) -cage. The Cage Problem is the problem of finding such smallest graphs and their orders for all pairs $k, g \geq 3$. This problem has been extensively studied since the 1960's when Erdős and Sachs proved the existence of infinitely many (k, g) -graphs for any pair (k, g) . Their original upper bound on the order of cages has been later improved by Sauer. In each case, an order was found with the property that a (k, g) -graph exists for each admissible order larger than this bound. We present a different approach and study the properties of (k, g) -graphs that can be extended into larger (k, g) -graphs by adding vertices. This approach may potentially give rise to recursive constructions based on smaller graphs than those identified by Erdős, Sachs, and Sauer.