



## HYPOHAMILTONIAN CUBIC GRAPHS OF GIRTH 7

EDITA MÁČAJOVÁ\*, MARTIN ŠKOVIERA

To decide whether a given graph is hamiltonian is a well known NP-complete problem and it is NP-complete even within the family of cubic graphs. *Hypohamiltonian graphs* – graphs for which the removal of an arbitrary vertex leads to a hamiltonian graph – lie on the border between the class hamiltonian graphs and its complement. Better understanding of hypohamiltonian graphs can therefore lead to demarcation line for hamiltonian graphs.

Roughly speaking, the higher girth and cyclic connectivity, the harder to find a hypohamiltonian graph with these parameters. Moreover, Thomassen conjectured, that there exists a constant  $k$  (possibly  $k = 8$ ) such that every cyclically  $k$ -edge-connected cubic graph is hamiltonian. Interesting in this sense is the Coxeter graph, having both girth and cyclic connectivity 7, for it is the only highly connected graph of girth at least 7 that is known to be hypohamiltonian. We provide a construction, which uses as building blocks a graph derived from the Coxeter graph, giving rise to an infinite family of cubic hypohamiltonian graphs of girth 7, with cyclic connectivity 4, 5, or 6.