Circumference of cubic graphs

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(joint work with Edita Máčajová)

The talk is focused on circumference of cubic graphs with a given degree of cyclic edge-connectivity. The *circumference deficit* of a graph G is the difference between order and circumference of G. The *circumference ratio* of a graph G is the ratio of circumference to order of G. We observe that a snark with large resistance has large circumference deficit. Together with our recent results on resistance [3], this gives a construction of infinite families of cyclically k-edge-connected cubic graphs with circumference ratio less than 1 for each $k \in \{2, 3, 4, 5, 6\}$. We extend these results for snarks of large girth, solving Problem 1 of [2]. In addition, we construct a family of non-trivial snarks of order $8k$ and circumference $7k + 2$ for each integer $k \geq 3$. This result contrasts a corollary of the well-known dominating circuit conjecture saying that each non-trivial snark G contains a cycle of length at least $3/4 \cdot |V(G)|$.

References

[1] G. Brinkmann, J. Goedgebeur, J. Hägglund, K. Markström, Generation and properties of snarks, arXiv:1206.6690.

[2] J. Hägglund, K. Markström, On stable cycles and cycle double covers of graphs with large circumference, Discrete Math. 312 (2012), 2540–2544.

[3] R. Lukoťka, E. Máčajová, J. Mazák, M. Škoviera, Small snarks with large oddness, arXiv:1212.3641.