

# Boxicity, Cubicity and Vertex Cover

Let  $G$  be a graph. Its boxicity is defined to be the minimum integer  $d$  such that it can be represented as the intersection graph of axis-parallel  $d$ -dimensional boxes. In a similar way, the cubicity of  $G$  is defined as the minimum dimension  $d$  such that  $G$  can be represented as the intersection graph of  $d$ -dimensional axis parallel cubes. (A cube is a box for which all the sides are of unit length.)

A classical parameter studied in graph theory is the cardinality of the minimum vertex cover. In this talk we will explore the relation between these three parameters: Boxicity, Cubicity and vertex cover. The main results that will be presented are the following:

1. The cubicity of any graph is at most  $k + \lceil \log(n - k) \rceil - 1$ , where  $k$  is the cardinality of the minimum vertex cover, and  $n$  is the number of vertices.
2. The boxicity of any graph is at most  $\lfloor k/2 \rfloor + 1$ , where  $k$  is the cardinality of the minimum vertex cover.

## References

- F. S. Roberts. On the boxicity and cubicity of a graph. In *Recent Progress in Combinatorics (Proc. Third Waterloo Conf. on Combinatorics, 1968)*, pages 301–310. Academic Press, New York, 1969.
- L. S. Chandran, Anita Das, Chintan Shah. Boxicity, Cubicity and Vertex Cover. *Discrete Mathematics* (Article in Press. DOI:10.1016/j.disc.2008.06.003).