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## Extremal problems in locally sparse multigraphs

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Say that a multigraph  $G$  is  $(s, q)$ -sparse if every  $s$ -set of vertices in  $G$  supports at most  $q$  edges, counting multiplicities. How large can the product of the edge multiplicities of  $G$  be if  $G$  is an  $(s, q)$ -sparse multigraph on  $n$  vertices?

This question was posed by Mubayi and Terry in 2016, with motivation coming from hypergraph container theory. It can also be seen as a natural attempt to generalise classical results from extremal graph theory to the setting of multigraphs with bounded edge multiplicities. That one seeks to maximise a product results in some unusual features and challenges, including extremal constructions with parts containing an asymptotically transcendental proportion of the vertices.

Despite recent progress, the answer to Mubayi and Terry’s question is still poorly understood for general  $(s, q)$ . In this talk, I will survey the background and motivation for the study of  $(s, q)$ -sparse multigraphs, as well as the (few) known results and the (many) open problems in the area.

## Références

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