

Guangzhou Discrete Mathematics Seminar



Rainbow triangles in edge-colored graphs

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In this talk, we shall survey our work on rainbow triangles in edge-colored graphs. In particular, we will give a sketch of a recent theorem of ours. This counting result states that the number of rainbow triangles in an edge-colored graph G is at least $\frac{1}{6}\delta^c(G)(2\delta^c(G) - n)n$, which is best possible by considering the rainbow k -partite Turán graph, where its order is divisible by k . This means that there are $\Omega(n^2)$ rainbow triangles in G if $\delta^c(G) \geq \frac{n+1}{2}$, and $\Omega(n^3)$ rainbow triangles in G if $\delta^c(G) \geq cn$ when $c > \frac{1}{2}$. This can be seen as a counting version of a previous theorem due to Hao Li.

References

- [1] B. Li, B. Ning, C. Xu, S. Zhang, Rainbow triangles in edge-colored graphs, *European J. Combin.* 36 (2014), 453–459.
- [2] S. Fujita, B. Ning, C. Xu, S. Zhang, On sufficient conditions for rainbow cycles in edge-colored graphs, *Discrete Math.* 342(7) (2019), 1956–1965.
- [3] X. Li, B. Ning, Y. Shi, S. Zhang, Counting rainbow triangles in edge-colored graphs, arXiv: 2112.14458.

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