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No additional tournaments are quasirandom-forcing

A tournament H is *quasirandom-forcing* if the following holds for every sequence $(G_n)_{n\in\mathbb{N}}$ of tournaments of growing orders: if the density of H in G_n converges to the expected density of H in a random tournament, then $(G_n)_{n\in\mathbb{N}}$ is quasirandom. Every transitive tournament with at least 4 vertices is quasirandom-forcing, and Coregliano, Parente, and Sato [2] showed that there is also a non-transitive 5-vertex tournament with the property. We show that no additional tournament has this property. This extends the result of Bucić, Long, Shapira, and Sudakov [1] that the non-transitive tournaments with seven or more vertices do not have this property.

This is joint work with Robert Hancock, Adam Kabela, Daniel Král', Taísa Martins, Roberto Parente, and Jan Volec.

References

[1] M. Bucić, E. Long, A. Shapira, and B. Sudakov, *Tournament quasirandomness from local counting*, arXiv:1910.09936, 2019.

[2] L. N. Coregliano, R. F. Parente, and C. M. Sato, *On the maximum density of fixed strongly connected subtournaments*, The Electronic Journal of Combinatorics, 26:P1.44, 2019.