Graz University of Technology

Institut für Diskrete Mathematik

Combinatorics Seminar

24.04.2026, 12:30

ONLY Online Meeting (webex)

Cycle-factors of regular graphs via entropy

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It is a classical result that a random permutation of n elements has, on average, about $\log n$ cycles. We generalise this fact to all directed d-regular graphs on n vertices by showing that, on average, a random cycle-factor of such a graph has $\mathcal{O}((n \log d)/d)$ cycles. This is tight up to the constant factor and improves the best previous bound of the form $\mathcal{O}(n/\sqrt{\log d})$ due to Vishnoi. It also yields randomised polynomial-time algorithms for finding such a cycle-factor and for finding a tour of length $(1 + \mathcal{O}((\log d)/d)) \cdot n$ if the graph is connected. The latter result makes progress on a restriction of the Traveling Salesman Problem to regular graphs, a problem studied by Vishnoi and by Feige, Ravi, and Singh. Our proof uses the language of entropy to exploit the fact that the upper and lower bounds on the number of perfect matchings in regular bipartite graphs are extremely close.

Webex link:

https://tugraz.webex.com/tugraz/j.php?MTID=m6449da69552289b0d7eef2d0d2a27197

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