Stellingen
behorende bij het proefschrift
Approaching equilibrium in a dynamic network

1. Under mild assumptions, the mixing time of a non-backtracking random walk on a dynamic version of the configuration model, where the graph evolves via rewiring dynamics, can be linked to the mixing time on the static configuration model. [Chapter 2]

2. The trichotomy observed in previous works on random walk mixing times in the setting of the configuration model equipped with rewiring dynamics is a limiting case of the hexachotomy (i.e., a six-way split) exhibited by a non-Markovian, location-dependent version of the rewiring dynamics. [Chapter 2]

3. Infinite-speed random walk, a particular distributional limit of the standard random walk on a graph, on top of a dynamic random permutation, in the limit as the number of permutation elements tends to infinity, exhibits a limiting total-variation mixing profile that remains at the value 1 until a random time, at which it jumps down to a specific curve and follows that curve afterwards. [Chapter 3]

4. The k-nearest neighbour graph, for an appropriate choice of k, is a useful model for a robust communication network between randomly placed transceivers, as it allows for a tractable study of network performance characteristics. [Chapter 4]

5. There exists a universal way to compare various centrality measures defined on the same graph based on the ordering these centrality measures induce. [Chapter 5]

6. While recent advances in machine learning have raised questions about the future of traditional mathematical modelling, there is no compelling reason to abandon models based on a profound understanding of the system. Traditional modelling remains indispensable in areas where interpretability and analytical insight are essential.

7. The ignorance of programming and computing by some mathematicians is just as inexplicable as would be the ignorance of modern medical imaging by current-day physicians. Programming is a highly useful, and in some areas essential, skill for a mathematician.

8. Some of the leading mathematical physicists of the 20th century lamented the divorce of mathematics and physics that they witnessed, and observed that the research and education in these fields drifted apart. Mathematicians lost a traditional source of inspiration, while some areas of physics suffered from avoidable errors due to insufficient mathematical rigor. This division continues to present challenges to interdisciplinary research.

9. Proof assistants, such as Lean, are transforming mathematical research by enabling more collaborative efforts, reducing human error through formal verification, and encouraging a shift toward computer-aided proof development. Recent breakthroughs by Gowers, Green, Manners, and Tao exemplify the potential of these tools in advancing rigorous and large-scale mathematical projects.

10. It is not realistic to expect academic scientists to be excellent at research, teaching, fundraising, management, and mentoring all at the same time.

11. People in general, and scientists in particular, should not be reluctant to raise daring points and should be open to the possibility of having their points refuted.

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