Notes on Recent Papers

Here are my brief summaries of some recent papers from the daily arXiv email yesterday, and the online spectrum conference where Pamela Harris gave a talk.

- This paper [2] by Pamela Harris and 3 other coauthors is about cost-sharing in parking games. This paper seems to be written by people who think about computational complexity, as inspired by some ideas in game theory. It seems that the main takeaway from this paper was that there is a polynomial time algorithm for computing Shapley values corresponding to parking functions which in general is p-complete. The focus on total displacement at the beginning of the paper made me wonder if there were connections to some of the indicator function and harmonic analysis ideas that we thought about at the end of the summer and the Shapley values that they were computing. From my initial look over the paper, I haven't dived deep enough into understanding their cost function and abundant notation to see that connection through.
- This paper [4] on a variation to the parking procedure called the MVP variation where newly arriving cars kick out cars which were already there. This changes the resulting parking outcomes, so they are studying the resulting structures in ways which seem to parallel some of the other papers that we saw from the summer including ascents, descents, and graph structure. Noncrossing matchings also came up which reminded me of the module decomposition for parking functions from the introduction of the Rhoades paper. Also a notion of prime came up in the context of these noncrossing matchings, which made me wonder if they correspond to prime parking segments.
- I went to a talk that Pamela Harris gave at the online spectrum conference. The talk went through the outline of this paper[1] connecting the appearance of boolean intervals (ie hypercube-like structures) in the weak right Bruhat order lattice for the symmetric group (ie directed permutahedron) to unit interval parking functions which are also fubini rankings. Later in the evening when I was skimming the paper, I realized that it would have been fun to ask about the connection to the paper by Meyles, Harris, etal connecting unit interval parking functions to faces of the permutahedron [3]. I guess I was a little surprised that the connection between the two papers wasn't directly called out in the paper (ie the permutahedron paper isn't cited in the other paper, though that could be because they only came out a month apart from each other)

References

[1] Jennifer Elder, Pamela E. Harris, Jan Kretschmann, and J. Carlos Martínez Mori. Boolean intervals in the weak order of $\mathfrak{S}_n$, 2023.

[2] Jennifer Elder, Pamela E. Harris, Jan Kretschmann, and J. Carlos Martínez Mori. Cost-sharing in parking games, 2023.

[3] Lucas Chaves Meyles, Pamela E. Harris, Richter Jordaan, Gordon Rojas Kirby, Sam Sehayek, and Ethan Spingarn. Unit-interval parking functions and the permutohedron, 2023.

[4] Thomas Selig and Haoyue Zhu. New combinatorial perspectives on mvp parking functions and their outcome map, 2023.