COMPUTATIONAL COMPLEXITY OF GREEDY PARTITIONING OF GRAPHS[1]

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In this talk we consider a variant of graph partitioning problem consisting in partitioning the vertex set into the minimum number of sets such that each of them induces a graph in a fixed hereditary class of graphs (property). For various properties we will discuss the computational complexity of several problems arising when partitions are generated by the greedy algorithm. In this context, we will point out the cases that are computationally hard, and those that can be solved in polynomial time. We will also present a lower bound based on the Exponential-Time Hypothesis as well as some basic result on generalized independence and domination allowing the dynamic programming approach in the construction of an exact algorithm. We will also mention an application of the above concepts to the construction of new χ-bounded classes of graphs.

References

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[3] R. Belmonte, E. J. Kim, M. Lampis, V. Mitsou, Y. Otachi, Grundy distinguishes treewidth from pathwidth, 28th *Annual European Symposium on Algorithms* (ESA 2020), LIPIcs 173 (2020) 14:1–14:19.

[1] Results partially obtained in cooperation with Ela Sidorowicz, Darek Dereniowski and Ewa Drgas-Burchardt