

# Hamiltonicity and chromatic number problems on restrictions of clique-width

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(joint work with Sebastian Ordyniak and Michael Lampis)

We investigate parametrized complexity of Hamiltonian path and chromatic number problems on restrictions of clique-width. These problems admit XP-algorithms [1, 3] (i.e. with runtime  $n^{f(k)}$ ) on classes of graphs of bounded clique-width and are also  $W[1]$ -hard with respect to clique-width [2]. This means that the existence of FPT algorithms (i.e. with runtime  $f(k) \cdot n^c$ ) for these problems on classes of graphs of bounded clique-width is unlikely. It is therefore natural to ask on which restrictions of clique-width these problems become fixed-parameter tractable. A natural candidate could be recently introduced shrub-depth [4]. We show that this is not the case – both Hamiltonian path and chromatic number problems remain  $W[1]$ -hard with respect to this parametrization. This suggests that in order to obtain FPT algorithms for these problems we need to restrict the parameter even more. To this end we introduce new parameter called *homogeneity width*, which admits FPT algorithms for both problems.

## REFERENCES

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