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## Tight Bounds for Chordal/Interval Vertex Deletion Parameterized by Treewidth

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## Michał Wlodarczyk

Abstract: In Chordal/Interval Vertex Deletion we ask how many vertices one needs to remove from a graph to make it chordal (respectively: interval). We study these problems under the parameterization by treewidth (tw) of the input graph G. On the one hand, we present an algorithm for Chordal Vertex Deletion with running time  $2^{\circ}O(tw)/V(G)$ , improving upon the running time  $2^{\circ}O(tw^2)|V(G)|^{\circ}O(1)$  by Jansen, de Kroon, and Wlodarczyk (STOC'21). When a tree decomposition of width tw is given, then the base of the exponent equals  $2^{\circ}(omega-1)3+1$ . Our algorithm is based on a novel link between chordal graphs and graphic matroids, which allows us to employ the framework of representative families. On the other hand, we prove that the known  $2^{\circ}O(tw\log tw)|V(G)|$ -time algorithm for Interval Vertex Deletion cannot be improved assuming Exponential Time Hypothesis.

Presenter: WLODARCZYK, Michał Session Classification: Track A-2