Structure of twin-width 1 graphs

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The graph parameter twin-width was introduced by Bonnet, Kim, Thomassé, and Watrigant [2], it generalizes a previous result on permutations with forbidden patterns due to Guillemot and Marx [3] to the setting of graphs. Most notably, graphs with bounded twin-width have linear time model-checking for first order formulae, assuming a certificate of the bound on twin-width is given. Obtaining such a certificate efficiently is however still open.

In this direction, one may try to get some intuition from small values of twin-width. The graphs of twin-width 0 are well-known : they are exactly the class of cographs. A polynomial algorithm for recognizing graphs of twin-width 1 was obtained in [1].

Thanks to a more detailed analysis on the structure of graphs that have twin-width at most 1, we obtain a linear time recognition algorithm and a decomposition theorem.

Références

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