

Local certification of/on sparse graph classes.

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Local certification consists in assigning labels to the nodes of a graph in order to certify that some given property is satisfied, in such a way that the labels can be checked by only looking at its neighborhood at distance one. In this talk, our goal is to certify that a graph G belongs to a given graph class. Such certifications exist for many sparse graph classes such as trees, planar graphs and graphs embedded on surfaces with labels of logarithmic size. It is open if such a certificate exist for any H -minor free graph class. We present some generic tools which allow us to certify the H -minor-free graphs (with logarithmic labels) for each small enough H .

More generally, we consider classes defined by any MSO formula (i.e. the MSO-model checking problem), and show a local version of the well-known Courcelle theorem: in bounded tree-depth graphs, logarithmic certificates can be obtained for any MSO formula. We will also discuss many open problems related to local certification of/on sparse graph classes.

(Joint works with Laurent Feuilloley and Théo Pierron)