

**Lagergren, Jens; Arnborg, Stefan****Finding minimal forbidden minors using a finite congruence.** (English) Zbl 0764.68122

Automata, languages and programming, Proc. 18th Int. Colloq., Madrid/Spain 1991, Lect. Notes Comput. Sci. 510, 532-543 (1991).

Summary: [For the entire collection see [Zbl 0753.00027](#).]

We give an effective way to compute the minimal forbidden minors for a minor-closed class of graphs of bounded tree-width from an algorithm that decides a finite congruence that recognizes the class. We prove constructively that every minor closed class of graphs of bounded tree-width that is recognized by a finite congruence has a finite number of minimal forbidden minors. Our proof gives a bound of the size of a minimal forbidden minor. We define explicitly a relation  $\sim$ , prove that it is a finite congruence that recognizes the graphs of tree-width at most  $w$ , and show how to decide it. Hence, we can find the minimal forbidden minors for graphs of tree-width at most  $w$  and bounds on their sizes. An algorithm that recognizes graphs of tree-width at most  $w$  in linear time is also obtained.

**MSC:**

- [68R10](#) Graph theory (including graph drawing) in computer science
- [68T10](#) Pattern recognition, speech recognition
- [05C35](#) Extremal problems in graph theory
- [05C05](#) Trees
- [05C38](#) Paths and cycles

Cited in **18** Documents**Keywords:**[linear time algorithm](#); [minimal forbidden minors](#); [graphs of bounded tree-width](#); [finite congruence](#); [bound](#)