

Courcelle, Bruno**Special tree-width and the verification of monadic second-order graph properties.** (English)[Zbl 1245.68133](#)

Lodaya, Kamal (ed.) et al., IARCS annual conference on foundations of software technology and theoretical computer science (FSTTCS 2010), December 15–18, 2010, Chennai, India. Wadern: Schloss Dagstuhl – Leibniz Zentrum für Informatik (ISBN 978-3-939897-23-1). LIPIcs – Leibniz International Proceedings in Informatics 8, 13-29, electronic only (2010).

Summary: The model-checking problem for monadic second-order logic on graphs is fixed-parameter tractable with respect to tree-width and clique-width. The proof constructs finite deterministic automata from monadic second-order sentences, but this computation produces automata of hyper-exponential sizes, and this is not avoidable. To overcome this difficulty, we propose to consider particular monadic second-order graph properties that are nevertheless interesting for graph theory and to interpret automata instead of trying to compile them (joint work with I. Durand).

For checking monadic second-order sentences written with edge set quantifications, the appropriate parameter is tree-width. We introduce special tree-width, a graph complexity measure between path-width and tree-width. The corresponding automata are easier to construct than those for tree-width.

For the entire collection see [[Zbl 1213.68048](#)].

MSC:

- [68Q60](#) Specification and verification (program logics, model checking, etc.)
- [68R10](#) Graph theory (including graph drawing) in computer science
- [03B70](#) Logic in computer science
- [68Q45](#) Formal languages and automata

Cited in 1 Review Cited in 3 Documents

Keywords:

[model-checking](#); [monadic second-order logic](#); [fixed-parameter tractability](#); [special tree-width](#)

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