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Title: SYSTEMATIC DERIVATION OF TREE CONTRACTION ALGORITHMS

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Abstract: While tree contraction algorithms play an important role in efficient tree computation in parallel, it is difficult to develop such algorithms due to the strict conditions imposed on contracting operators. In this paper, we propose a systematic method of deriving efficient tree contraction algorithms from recursive functions on trees. We identify a general recursive form that can be parallelized into efficient tree contraction algorithms, and present a derivation strategy for transforming general recursive functions to the parallelizable form. We illustrate our approach by deriving a novel parallel algorithm for the maximum connected-set sum problem on arbitrary trees, the tree-version of the well-known maximum segment sum problem.

Keywords: Tree Contraction; Parallelization; Skeletal Parallelism; Rose Tree; Maximum Segment Sum Problem

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