Mahajan, Sanjeev; **Peters, Joseph G.**
Regularity and locality in k-terminal graphs. (English) │ Zbl 0822.68084 │
Discrete Appl. Math. 54, No. 2-3, 229-250 (1994).

Summary: *M. W. Bern*, *E. L. Lawler* and *A. L. Wong* J. Algorithms 8, 216-235 (1987; Zbl 0618.68058) described a general method for constructing algorithms to find an optimal subgraph in a given graph. When the given graph is a member of a k-terminal recursive family of graphs and is presented in the form of a parse tree, and when the optimal subgraph satisfies a property that is regular with respect to the family of graphs, then the method produces a linear-time algorithm. The algorithms assume the existence of multiplication tables that are specific to the regular property and to the family of graphs. In this paper we show that the general problem of computing these multiplication tables is unsolvable and provide a "pumping" lemma for proving that particular properties are not regular for particular k-terminal families. In contrast with these negative results, we show that all local properties, that can be verified by examining a bounded neighbourhood of each vertex in a graph, are regular with respect to all k-terminal recursive families of graphs, and we show how to automate the construction of the multiplication tables for any local property.

MSC:

68R10	Graph theory (including graph drawing) in computer science	Cited in **5** Documents
05C05	Trees	
05C78	Graph labelling (graceful graphs, bandwidth, etc.)	

Keywords:

regular graph properties; k-terminal recursive graphs; parse tree; linear-time algorithm

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