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Synthesizing minimal tile sets for patterned DNA self-assembly. (English) Zbl 1309.68210

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Summary: The Pattern self-Assembly Tile set Synthesis (PATS) problem is to determine a set of coloured tiles that self-assemble to implement a given rectangular colour pattern. We give an exhaustive branch-and-bound algorithm to find tile sets of minimum cardinality for the PATS problem. Our algorithm makes use of a search tree in the lattice of partitions of the ambient rectangular grid, and an efficient bounding function to prune this search tree. Empirical data on the performance of the algorithm shows that it compares favourably to previously presented heuristic solutions to the problem.

For the entire collection see [\[Zbl 1205.68022\]](#).

MSC:

[68W05](#) Nonnumerical algorithms

[68P05](#) Data structures

[68R05](#) Combinatorics in computer science

[68T20](#) Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

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Full Text: [DOI](#)

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