

**Göös, Mika; Lempiäinen, Tuomo; Czeizler, Eugen; Orponen, Pekka**

**Search methods for tile sets in patterned DNA self-assembly.** (English) Zbl 1311.68150  
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Summary: The pattern self-assembly tile set synthesis (PATS) problem, which arises in the theory of structured DNA self-assembly, is to determine a set of coloured tiles that, starting from a bordering seed structure, self-assembles to a given rectangular colour pattern. The task of finding minimum-size tile sets is known to be NP-hard. We explore several complete and incomplete search techniques for finding minimal, or at least small, tile sets and also assess the reliability of the solutions obtained according to the kinetic tile assembly model.

**MSC:**

- 68T20 Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.) Cited in 4 Documents
- 52C20 Tilings in 2 dimensions (aspects of discrete geometry)
- 68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)
- 92D20 Protein sequences, DNA sequences

**Keywords:**

DNA self-assembly; tilings; tile assembly model; pattern assembly; tile set synthesis; reliable self-assembly

**Software:**

Gringo; Smodels

**Full Text:** [DOI](#)

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