A beam-search approach to the set covering problem

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In this work we present a beam-search approach applied to the Set Covering Problem. The goal of this problem is to choose a subset of columns of minimal cost covering every row. Beam Search constructs a search tree by using a breadthfirst search strategy, however only a fixed number of nodes are kept and the rest are discarded. Even though original beam search has a deterministic nature, our proposal has some elements that makes it stochastic. This approach has been tested with a well-known set of 45 SCP benchmark instances from OR-Library showing promising results.

Beam search

Branch-and-Bound

Greedy

SCP

Benchmarking

Branch and bound method

Intelligent systems

Stochastic systems

Beam search

Breadth-first search

Fixed numbers

Greedy

Minimal cost

Search trees

Set covering problem

Artificial intelligence