



Swap-vertex based neighborhood for Steiner tree problems

Submitted by Jin-Kao Hao on Sun, 06/04/2017 - 09:35

Titre Swap-vertex based neighborhood for Steiner tree problems

Type de publication Article de revue

Auteur Fu, Zhang-Hua [1], Hao, Jin-Kao [2]

Editeur Springer Verlag

Type Article scientifique dans une revue à comité de lecture

Année 2017

Langue Anglais

Date Juin 2017

Numéro 2

Pagination 297-320

Volume 9

Titre de la revue Mathematical Programming Computation

ISSN 1867-2949

Mots-clés 11th DIMACS Implementation challenge [3], Auxiliary evaluation function [4], Network design [5], Steiner tree problems [6], Swap-vertex move [7]

Résumé en anglais Steiner tree problems (STPs) are very important in both theory and practice. In this paper, we introduce a powerful swap-vertex move operator which can be used as a basic element of any neighborhood search heuristic to solve many STP variants. Given the incumbent solution tree T , the swap-vertex move operator exchanges a vertex in T with another vertex out of T , and then attempts to construct a minimum spanning tree, leading to a neighboring solution (if feasible). We develop a series of dynamic data structures, which allow us to efficiently evaluate the feasibility of swap-vertex moves. Additionally, in order to discriminate different swap-vertex moves corresponding to the same objective value, we also develop an auxiliary evaluation function. We present a computational assessment based on a number of challenging problem instances (corresponding to three representative STP variants) which clearly shows the effectiveness of the techniques introduced in this paper. Particularly, as a key element of our KTS algorithm which participated in the 11th DIMACS implementation challenge, the swap-vertex operator as well as the auxiliary evaluation function contributed significantly to the excellent performance of our algorithm.

URL de la notice <http://okina.univ-angers.fr/publications/ua15968> [8]

DOI 10.1007/s12532-016-0116-8 [9]

Lien vers le document <https://link.springer.com/article/10.1007%2Fs12532-016-0116-8> [10]

Titre abrégé Math. Prog. Comp.

Liens

- [1] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=10751>
- [2] <http://okina.univ-angers.fr/jinkao.hao/publications>
- [3] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=23018>
- [4] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=23017>
- [5] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=8742>
- [6] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=23015>
- [7] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=23016>
- [8] <http://okina.univ-angers.fr/publications/ua15968>
- [9] <http://dx.doi.org/10.1007/s12532-016-0116-8>
- [10] <https://link.springer.com/article/10.1007%2Fs12532-016-0116-8>

Publié sur *Okina* (<http://okina.univ-angers.fr>)