Two hybrid ant algorithms for the general T-colouring problem

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Abstract

GCP is a well-known combinatorial problem that admits several generalisations from which the T-colouring (GTCP). Given a graph G and sets T of positive integers associated to the edges of G, a T-colouring of G is an assignment of colours to its vertices so the assigned colours distances do not exist in the associated set T. Since this problem is NP-Complete, only few heuristics are implemented for restricted conditions on the sets T. The ant colony optimisation (ACO) has been successfully applied to different problems [SAL08]. Nevertheless, no attempt of ACO has been published for the T-colouring problem. We introduce, in this paper, two hybrid evolutionary approaches combining an ACO algorithm and a tabu search for the GTCP. These approaches are experimented for the general and restricted cases of the GTCP with different parameter's settings. The results are encouraging and show often better results than those published.

Keywords

T-colouring, metaheuristics, tabu search, ant colony optimisation, ACO, span, graph colouring problem, bio-inspired computation