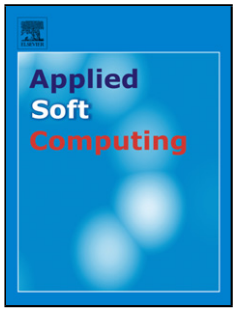


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# An iterated local search algorithm for the University Course Timetabling Problem

Ting Song, Sanya Liu, Xiangyang Tang, Xicheng Peng, Mao Chen*

*National Engineering Research Center for E-learning, Central China Normal University, 430079 Wuhan, China*

*Corresponding author. E-mail address: chenmao@mail.ccnu.edu.cn (M. Chen).

Highlights

- A iterated local search algorithm for solving University Course Timetabling Problem.
- A simulated annealing based local search is proposed to find the local minimum.
- A diversification procedure is to bring moderate perturbation to current solution.
- The algorithm achieves competitive results on 60 problem instances.
- The effects of important components of the proposed algorithm are analyzed.

**Abstract**

In this paper, an iterated local search algorithm is proposed to find the feasible solution for the University Course Timetabling Problem. Three key phases are involved in the proposed algorithm framework: initialization, intensification and diversification. Once a partial-feasible initial timetable is constructed, a simulated annealing based local search and a diversification procedure that brings moderate perturbation or even improvement to the current solution are performed in an iterative manner until a stop condition is met. The proposed algorithm is evaluated on a widely used dataset containing 60 problem instances. The computational results show the iterated local search algorithm achieves highly competitive results compared with the existing algorithms. It is noteworthy that this algorithm can find feasible solutions for 58 instances in reasonable time, including three large instances whose feasible solutions are missed in previous papers. Furthermore, some key elements and properties of the algorithm are also analyzed.

Keywords: Simulated Annealing; Iterated Local Search; Course Timetabling.

## 1. Introduction

The timetabling problem is to arrange a given number of events to a number of resources (timeslots, rooms, etc.) and ensure a predefined set of constraints is satisfied. Encountered in a number of different domains, timetabling has many variations such as course and examination timetabling [1], sports timetabling [2], nurse rostering [3], transport timetabling [4] and so forth. We consider the University Course Timetabling Problem (UCTP) in this paper, which is a special class of educational timetabling.

UCTP is a basic model resulted from the reduction of a real-world timetabling problem [5]. In 2002/2007, UCTP was proposed as the sole topic in the first/second International Timetabling Competition sponsored by PATAT. The