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A binary linear programming model for a case study in university timetabling problem

Welahetti L.R.[1] and Samarathunga D.M.[2*]
[1]*Department of Physical Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka.*
[2]*Department of Mathematics, University of Ruhuna, Matara, Sri Lanka.*

In this study, a university timetabling problem is addressed and proposed a two-phase approach for solving the problem. The timetabling problem is a combinatorial, NP-complete optimization problem. Due to its practicability and complexity, timetabling problem is prominent among the researchers and has sound literature equipped with various methodologies and solution techniques. Among the various timetabling problems, addressed in the literature, university course timetabling is more complex due to the sophisticated course structures, a large number of student groups, and many other requirements imposed by the institution. University timetabling problems can be hardly generalized due to the different inherent characteristics of the timetabling problem from institution to institution. And hence, many studies are focused on case studies while extending and generalizing to a certain extend. In this study, the timetabling for semester I of the Faculty of Science, University of Ruhuna, Sri Lanka is selected as a case study. Two-phase approach is proposed to produce the timetable. In the first phase, a binary linear programming model is constructed to determine the feasibility of the number of optional courses to offer at different time slots. Using the genetic algorithm, the constructed model is solved and the optimum number of classes that can be assigned to different timeslots is determined. Once the optimum allocation is determined, the second phase is devoted to find the optimal timetabling treating the preferable constraints as objectives. Genetic algorithm is used to solve the phase two problem and an automated timetable is produced.

Keywords: Optimization, Integer programming, Timetabling

*Corresponding author: samaremath@gmail.com