Mathematical Modelling in Management of Railways Timetable Based on Circulation Scheme and Rescheduling Approach

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Abstract

In each country, the railway system plays an important role in transporting goods and human beings. In India, for example; Railways are accountable for 30% of the transportation of the total number of goods. In this chapter, an integer linear programming model was discussed on the basis of the fixed departure or arrival of trains, in the case of the original timetable and corresponding circulation scheme. The main objective of this chapter is to optimize the circulation scheme in order to get more connections, especially without changing the direction of the trains.

Keywords: Integer programming; optimization problems; railway rescheduling; timetable; transportation.

1 Introduction

The main problem of this is railway management that a single delayed train can delay the entire network. The timetable specifies the arrival and departure times of each train at every station (Lin & Kwan, 2016).

The timetable is a major factor in the planning, which ensures the quality of service provided by the management (Wang et al., 2019). The main objective of infrastructure management is to minimize the delay as well as to handle the traffic flow. The circulation of train sets has a direct relation with operating cost and performance (Heilporn et al., 2008).

Timetable scheduling is always the first stage in planning based on the given path (Xie & Li, 2012). This chapter used Matlab to solve the timetable rescheduling problem where the original train-set circulation chart is given (Xie et al., 2010).

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