

OPTIMAL TIMETABLE SYNCHRONIZATION FOR GREATER KUALA LUMPUR USING MIXED INTEGER PROGRAMMING

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ABSTRACT

Greater Kuala Lumpur transportation system (GKL) operates 11 rail lines and 192 stations. Passengers using GKL often missed the next connecting train to their destination. They also frequently must rush to catch this train. This problem may have been caused by unsynchronized tabling of train schedules. The study aimed to produce an optimal synchronized timetable for GKL. Using Mixed Integer Programming and Heuristic Approach in Code Blocks platform, it was able to determine the estimated departure times during Rush-Hour and Non-Rush-Hour periods to produce arrival times for the new timetable. Maximum number of synchronizations obtained for Rush-Hour and Non-Rush-Hour periods were 108 cycles and 66 cycles, respectively. A comparative analysis was made between waiting times of the original timetable and the newly developed timetable. The efficiency rate for the Rush-Hour period was 86.11% while the Non-Rush Hour was 31.03%. Therefore, the study has achieved its objective and four timetables for routes 1 and 2 were able to be constructed. Future research works in this area may consider expanding this optimal synchronized timetable by including the other 10 lines and all other train stations in GKL. The study also recommends adding new variables such as headways, dwell times and runtimes.

Keywords: Heuristic Approach, Mixed Integer Programming, Timetable Synchronization