Optimal schedule for repair a double-track railroad. [1]

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In this research it was consider the problem of the optimal scheduling of the train operation by a double track railroad when one of the segments is under repair works.

Let us assume that there exist a scheduling $\pi^{'}$ ordering all the trains running to the receiving station to pass each signal post according to the schedule. Also, there exist a set of time moments E when the segments i were closed: $E = \{[t^{'}_{i1}, t^{''}_{i1}], [t^{'}_{i2}, t^{''}_{i2}], ...\}$.

It is necessary to create a new scheduling π considering the task with the following objective function:

$$\min \sum \omega_j \max\{0, C_j(\pi) - C_j(\pi^{'})\},$$

where ω_j – is the weight of the train i, $C_j(\pi)$ and $C_j(\pi^{'})$ – are the values of the objective function for the scheduling π and $\pi^{'}$, respectively.

Application of dynamic programming is very effective for the solution of this problem. Moreover, any regular objective function can used in order to find solution of this issue.

In order to check our algorithm in the real life the test was created. We choose the part of the railway between the following stations: Costa and Babaevo which contains nine semaphores. According to the recent statistics of the Russian Railway Company approximately fifty trains ply to each direction per day. Current implementation of the algorithm can find solution to the same task with eighty trains to each direction for thirty minutes applying 8 core computer.

REFERENCES

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