

The problem of scheduling a freight train as a problem of integer programming.

Alexander Lazarev¹, Elena Musatova², Nail Husnullin³

¹ *V.A.Trapeznikov Institute of Control Sciences RAS, Moscow, Russia;*

M.V.Lomonosov Moscow State University;

National Research University Higher School of Economics; jobmath@mail.ru

² *Institute of Control Sciences RAS, Moscow, Russia; nekolyap@mail.ru*

³ *Institute of Control Sciences RAS, Moscow, Russia; nhusnullin@gmail.com*

The central question that motivates this paper is the problem of making up a freight train and the routes on the railway. It is necessary from the set of orders available at the stations to determine time-scheduling and destination routing by railways in order to minimize the total completion time. In this paper it was suggested formulation of this problem by applying integer programming.

Moreover, In this paper it was shown that depending on the situation, the task can be formulated in different ways: the number of train can be fixed or leave arbitrary; change objective function, routes, train schedules and so on. In the all situation the task is a problem of integer programming and for which exists the number of exact or approximation approaches. It's important to imphasize that the effectiveness of the problem solution it depends on analysis of the structure of the constraint set and select an appropriate method of solution.

REFERENCES

1. *Lazarev A.A., Musatova E.G., Gafarov E.R., Kvaratskheliya A.G.* Theory of Scheduling. The tasks of railway planning. – M.: ICS RAS, 2012. – p.92
2. *Lazarev A.A., Musatova E.G., Gafarov E.R., Kvaratskheliya A.G.* Theory of Scheduling. The tasks of transport systems management. – M.: Physics Department of M.V.Lomonosov Moscow State University, 2012. – p.160
3. *A. Caprara, L. Galli, P. Toth.* Solution of the Train Platforming Problem Transportation Science. 2011. - 45 (2), P. 246-257.