Maximizing the profit of a logistics company with limited capital

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The trading company buys goods in bulk and sells them in the retail market. For each product $i = 1, 2, \ldots, N$ the following parameters are known: λ_i – intensity of sale; $\alpha_i + \beta_i v_i$ – cost ordering and delivery of a batch of v_i; c_i – the unit cost of the sale; c_i^{xp} – the cost of storing a unit of goods per unit time. The optimal period T_i^* and the corresponding import volume $v_i^* = T_i^* \lambda_i$ is determined from the condition for maximizing the specific net reduced the profit $U_i(T_i) = \frac{1}{T_i}(\int_0^{T_i} \frac{c_i \lambda_i}{(1+r_0)^t} dt - \alpha_i - \beta_i T_i \lambda_i - \int_0^{T_i} \frac{(T_i \lambda_i - t \lambda_i) c_i^{xp}}{(1+r_0)^t} dt)$, where r_0 – the norm of alternative risk-free allocation of liquidity of capital [1].

Currently, in most firms that sell a wide range of goods, orders are made automatically without the participation of employees of the company. At the next order the program uses current values ??of parameters of intensity, cost and so on. In practice, there are situations when the program calculated by the program robot is not provided with finances. This is possible during the payment of taxes, the diversion of some amounts to external or domestic investment. Due to the lack of working capital, the application has to be reduced. With several hundred or even thousands of positions in the nomenclature, this can not be done manually. The model is constructed and algorithms are developed to automate the process of minimizing losses while reducing the application, taking into account the possibility of using short-term loans.

References

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