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ASUPRA PROBLEMEI EXPANSIUNII OPTIMALE A UNEI INTREPRINDERI

(On the problem of the optimal expansion of an enterprise)

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The problem of increasing the capacity of an enterprise contingent upon obtaining maximum profit is dealt with. The discrete variant of the problem is formulated and the possibility of its numerical solution is indicated by means of dynamic programming. The problem is the following:

Let 1, 2..., N be the periods taken into consideration for extending the capacity of an enterprise. In each period $i (i = 1, 2, ..., N)$ the demands for the manufactured product are ξ, $1 \leqslant i \leqslant N$, all known. Production capacity is y, $1 \leqslant i \leqslant N$, unknown (the initial capacity $j_0 = c$ is considered known).

The problem is to make the total profit a maximum

$$max \sum_{i=1}^{N} \alpha_i \, [min(\xi_i, \; y_i) - \gamma(y_i - y_{i-1})]$$

in the conditions $0 \leqslant y_i - y_{i-1} - \beta i = 1, 2, \ldots, N, -y_0 = c$ where γ is the "marginal cost" of the increase of capacity by one unit, and α_1 are factors of income updating.

A relation of recurrence is obtained for the computation of the maximum profit as well as a few characteristics relating to their dependency on the initial capacity which is considered in all cases as a parameter. Likewise, the optimum strategy is obtained in the form of a series of functions of the initial capacity.

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