Volosatova T. A., Pavlov I. V., Uglich S. I. (Rostov-on-Don, Russia) **Minimax Problem in a Task with Priorities.**

Consider the function $\mathbf{F} = \Pi_{j=1}^{k} E^P(u_j^{\alpha_j})$, where all $u_j > 0$ and $\alpha_j = \alpha_j(\omega)$ are r.v., defined on $(\Omega, \mathcal{F}, P)$ and satisfying the conditions $P(0 < \alpha_j < 1) > 0$. We investigate the case when $u_k = -\sum_{i=1}^{k-1} c_i u_i + \sum_{i=1}^{k-1} c_i b_i + b_k > 0$ and all constants $b_j > 0$. Thus, for any fixed vector of parameters $(c_1, \ldots, c_{k-1})$, the function $\mathbf{F}$ depends on $(u_1, \ldots, u_{k-1})$ (it is denoted below by $F = F(u_1, \ldots, u_{k-1})$) and is defined on the set $\{u_1 > 0, \ldots, u_{k-1} > 0, \sum_{i=1}^{k-1} c_i u_i < \sum_{i=1}^{k-1} c_i b_i + b_k\}$. From [1,2] it follows that if all $c_j > 0$ and are fixed, then the function F has in its domain of definition a single point $(u_1^\star, \ldots, u_{k-1}^\star)$ of the local maximum (which is also the global maximum point of the function F). Denote $F_{max}(c_1, \ldots, c_{k-1}) = F(u_1^\star, \ldots, u_{k-1}^\star)$.

Theorem. *The function F_{max} in its domain of definition $\{c_1 > 0, \ldots, c_{k-1} > 0\}$ has a unique stationary point. This point is the minimum point.*

This minimax theorem is used in the problem of optimizing of interaction within a unified system of a number of institutions and an “optimizer” interested in the successful functioning of the system and acting on the basis of expert evaluations implemented in the form of independent random priorities α_j.

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