Krasii N. P., Pavlov I. V. (Rostov-on-Don, Russia) **Generalization of the model with priorities.**

Consider on a probability space $(\Omega, \mathcal{F}, P)$, a function of the form:

$$F(u_1, u_2, \ldots, u_k) = E^P \left(\prod_{j=1}^{k} f_j(u_j, \cdot) \right). \quad (1)$$

Theorem. Let for the functions $f_j(u_j, \omega)$, $j = 1, \ldots, k$, the following conditions be satisfied:

1) $f_j(u_j, \omega)$ is defined and measurable on $[0, \infty) \times \Omega$, continuous on $[0, \infty)$ for P-almost all $\omega \in \Omega$ and satisfies the equality $f_j(0, \omega) = 0$;

2) $f_j(u_j, \omega)$ is twice continuously differentiable on $(0, \infty)$ for P-almost all $\omega \in \Omega$, and besides the first and second derivatives are bounded on sets of the form $K \times \Omega$, where K is a compact on $(0, \infty)$;

3) for P-almost all $\omega \in \Omega$ and $\forall u_j \in (0, \infty)$ $f_j(u_j, \omega) > 0$, its first derivative is strictly greater than zero and its second derivative is strictly less than zero;

4) $u_k = -\sum\limits_{j=1}^{k-1} c_j u_j + c_k$, where $c_j > 0, j = 1, 2, ...k$.

Then function (1) has in the domain $\{u_j > 0, j = 1, 2, ...k-1, \sum\limits_{j=1}^{k-1} c_j u_j < c_k\}$ the unique stationary point that is local (and also global) maximum point.

If we put $f_j(u_j, \omega) = u_j^{\alpha_j(\omega)}$, where $\alpha_j(\omega)$ is a random variable (priority), $P(\alpha_j = 0) = 0$ and $P(0 < \alpha_j < 1) > 0$, then (1) coincides with the function obtained in the optimization problem for a quasilinear model with independent priorities α_j (see [1]). The presented theorem generalizes Theorem 1 in [1].

REFERENCES

1. *Pavlov I. V., Uglich S.I.* Optimization of complex systems of quasilinear type with several independent priorities. Vestnik RGUPS. 2017. N 3(67), pp. 140-145.

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