Fedotkin A. M., Fedotkin A. A. (National Reseach Lobachevsky State University, Nizhny Novgorod, Russia), **Probabilisti properties of non-ordinary flows on a highway.**

In the works [1, 2] the mathematical model of the dynamics of the movement of a traffic flow of heterogeneous vehicles under bad weather and road conditions on a highway is proposed, taking into account both the spatial and temporal process. Let us denote by $\eta(t)$ the number of vehicles entering the queuing system over a period of time the number of vehicles entering the queuing system over a period of time $[0,t)$. Flow model $\{\eta(t) : t \geq 0\}$ – this is an extraordinary Poisson flow (movement of packets). Let one, two or three applications with probabilities p, q and s be received at each calling moment. Let us denote the intensity of the incoming packets as λ.

Let $P_m(t) = P(\eta(t) = m), m = 0, 1, \ldots$. The following theorem is true.

Теорема. Generating function

$$\Psi(t,z) = \sum_{m=0}^{\infty} P_m(t) z^m \tag{1}$$

one-dimensional distributions of the process $\{\eta(t) : t \geq 0\}$ при $t \geq 0$ и $|z| \leq 1$ has the form

$$\Psi(t,z) = e^{-\lambda t} \sum_{m=0}^{\infty} z^m \sum_{i=0}^{\left[\frac{m}{2}\right]} \sum_{j=0}^{\left[\frac{m-2i}{3}\right]} p^{m-2i-3j} q^i s^j \frac{(\lambda t)^{m-i-2j}}{i! j! (m-2i-3j)!} \tag{2}$$

where $[x]$ – this is the integer part of the number x.

Using the proven theorem, we can now write the formula for the function $P_m(t)$, $m = 0, 1, 2, \ldots$.

REFERENCES

[1] M. A. Fedotkin and A. M. Fedotkin, Analysis and optimization of output processes of conflicting Gnedenko-Kovalenko traffic streams under cyclic control, Autom. Remove Control , 70 (2009), pp. 2024 – 2038, https://doi.org/10.1134/S0051179120108.

[2] A. A. Fedotkin, A. M. Fedotkin, Study of the properties of the Gnedenko-Kovalenko flow, Bulletin of Lobachevsky University of Nizhny Novgorod. 2008, No. 6, pp. 156-160.