Fedotkin A. M., Fedotkin A. A. (National Reseach Lobachevsky State University, Nizhny Novgorod, Russia), **The existence of a stationary cyclic control regime with extension and additional servicing by extraordinary flows.**

In [1] a mathematical model of cyclic control of conflicting traffic flows is investigated. Let us consider the control system for conflicting extraordinary flows Π_1 and Π_2 using a cyclic algorithm with extension and additional servicing [2]. For $j = 1, 2$ the flow Π_j is extraordinary with intensity λ_j. At each calling moment, one, two or three requests with probabilities p_j, q_j or s_j can arrive along the flow Π_j.

Let's study the random sequence $\{(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1}), i \in \{0, 1, \ldots\}\}$, where Γ_i state of the device over a period of time $[\tau_i, \tau_{i+1})$, $\kappa_{j,i} \in X$ — queue size of flow Π_j at the moment τ_i, $\xi'_{j,i-1} \in \{0, 1, ..., l_j\}$ — the number of non-uniform demands of the flow actually served Π_j over a period of time $[\tau_{i-1}, \tau_i)$. The change of the current state of the service device is accepted at random moments in time $\tau_0, \tau_1, ...$ $\{(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1});\ i \in \{0, 1, \ldots\}\}$ is a homogeneous Markov chain [3].

Theorem. For the existence of a stationary distribution of a homogeneous Markov chain $\{(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1});\ i \in \{0, 1, \ldots\}\}$ it is sufficient to satisfy the conditions $\lambda_1 T(3s_1 + 2q_1 + p_1) - l_1 < 0$, $\lambda_2 T(3s_2 + 2q_2 + p_2) - l_2 < 0$, where T minimum cycle of changing the states of the service device and l_1, l_2 determine the maximum throughput of the system for flow Π_1, Π_2 respectively.

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