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Classification of the process of managing extraordinary flows using a cyclic algorithm with extension and additional maintenance.

Let $\{(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1}), i \in \{0, 1, \ldots\}\}$ vector random sequence, where $\Gamma_i \in \{\Gamma^{(e)}; e = 1, 2, 3, 4\}$ state of the device over time $[\tau_i, \tau_{i+1})$, $\kappa_{j,i} \in \{0, 1, ...\}$ is a queue size of the incoming extraordinary flow Π_j [1] in the moment τ_i and random value $\xi'_{j,i-1} \in \{0, 1, ..., l_j\}$ — actual number of heterogeneous flow requests served Π_j over a period of time $[\tau_{i-1}, \tau_i)$. The current state of the servicing device changes at random times $\tau_0, \tau_1, ...$ Let us denote $Q_i(\Gamma^{(e)}, x_1, x_2, y_1, y_2)$ random vector distribution $(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1})$. Then the following theorem is true.

Theorem.

For any initial distribution of the vector sequence $\{(\Gamma_i, \kappa_{1,i}, \kappa_{2,i}, \xi'_{1,i-1}, \xi'_{2,i-1}),$ $i \in \{0, 1, \ldots\}\}$, for all values $\Gamma^{(e)}, x_1, x_2, y_1, y_2$ or $\lim_{i\to\infty} Q_i(\Gamma^{(e)}, x_1, x_2, y_1, y_2) = 0$, or $\lim_{i\to\infty} Q_i(\Gamma^{(e)}, x_1, x_2, y_1, y_2) = Q(\Gamma^{(e)}, x_1, x_2, y_1, y_2) \geq 0$ and therefore there is a unique stationary distribution.

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