Thus, the IWRM system can provide its own fundamentally new approach to the formation and improvement of the mechanism of interstate cooperation in the use of regional water resources.

References

1. Yakubov M.S. The concept of competitiveness and modernization of the economic management system. International conference "Actual problems of development of info-communications and information society". Tashkent 2015. 609-614 p.

2. Xujakulov T.A. The problems of information and telecommunication technologies. Republican scientific and technical conference "Ensuring the integrity of information flows in the process of their logistics through the channels of the network." Tashkent 2015. 86-88 p.

3. Yakubov M.S., Xujakulov T.A., Husanov M.M. International Scientific and Technical Conference "Advanced Environmental Information Technology" "The role of environmental assessment in the preparation and reconstruction of water sector projects" SAMARA, 2017 1040-1044 p.

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MATHEMATICAL MODEL OF INTERACTIVE NETWORKS

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At creation of any information network one of main are problems of receiving, preprocessing and distribution of information for the purpose of development of some managements of both local, and remote objects. At a large number of objects (terminals) the network uses multiple branched communication channels. At creation of such network by all means there are problems of rational use of channels. For the solution of these tasks it is necessary to have not only information on quantity of objects, geographical structure of their position, but also on functional features of information exchange between objects in system. In practice information networks have to provide information exchange between objects of system: automata, operators, computer etc.At a large number of terminals the transferred information volume significantly increases in network.For more effective use of channels of network enter special points of information processing (figure 1) into structure of network.At these points the information received from the terminals is processed, accumulated and redistributed to the required addresses.

At the same time in any information network distributed on big space channels of various physical nature can be used [1].Such tasks require special approach to creation of information networks. For example, the part of canals can be realized on the physical communication lines providing a persistent connection between terminals. On the other hand, today the large role is played by wireless communication lines.

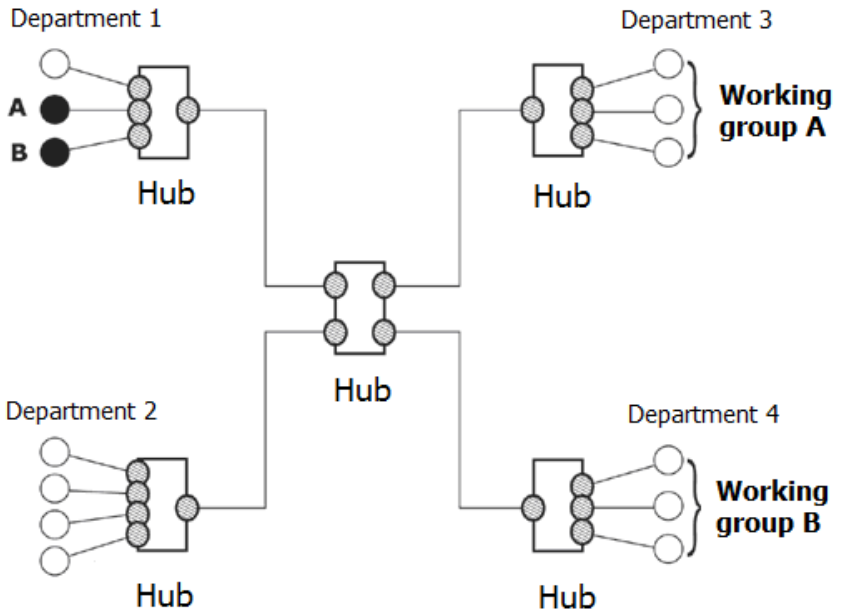

Figure 1 - Physical structuring of the network based on hubs

Nevertheless, it is necessary to understand that what information channels wouldn't be used in network, the principles of building and managing such a network remain largely similar.

For the mathematical description of network we will enter the following designations. Let N – the closed information network formed by the L systems S_i ($i=1,...,L$) with intensity of information processing at control points μ_i and containing Q information queries of one class.

Transitions of queries between systems in the process of functioning of network are defined by irreducible route matrix $\Theta=(\theta_{ij})$ ($i,j=1,...,L$).

Let the vector of $s^{(n)}=(s_i^{(n)})$ set a condition of network with number n, where $s_i^{(n)}$ - number of the queries which are in system S_i. The set of network states X network has the power of $c_X=|X|$. The stationary probability of a status of $s^{(n)}$ is defined by the following expression:

$$P(s^{(n)})=\frac{1}{G(Q,L)}\prod_{j=1}^{L}x_j^{s_j^{(n)}},\ s^{(n)}\in X, \tag{1}$$

where $x_j=\omega_j/\mu_j$; $\omega=(\omega_j)$ ($j=1,...,L$) is called a vector of the relative intensities of flows of information queries. G(Q,L) is the normalizing constant defined as:

$$G(Q,L)=\sum_{s^{(n)}\in X}\prod_{j=1}^{L}x_j^{s_j^{(n)}} \tag{2}$$

Stationary probabilities $P(s^{(n)})$ are the solution of equilibrium equations which for a network N can be given in the form:

$$\left[\sum_{j=1}^{L}\varepsilon(s_j^{(n)})\mu_j\right]P(s^{(n)})=\sum_{i=1}^{L}\sum_{j=1}^{L}\varepsilon(s_j^{(n)})\mu_i\theta_{ij}P(s^{(n)}+e_i-e_j), \tag{3}$$

where e_i is a vector of dimensionality of L which every i of components is equal 1 and remaining components are equal 0.

We will designate through $I = \{1,...,L\}$ and $B = \{1,...,c_X\}$ sets of numbers of systems and numbers of network conditions. We will enter designations for stationary characteristics of a network *N*:

λ_i - intensity of the entering flow of queries in system S_i;

$\bar{s}_i$ - mathematical expectation of number of queries in system S_i;

$\bar{u}_i$ - mathematical expectation of duration of queries processing in system S_i;

Ψ - utilization coefficient of information channel in system S_i.

Set of statuses of *X* are defined for implementation of a network *N* when in it there are *Q* queries. We will receive expression for utilization coefficient of information channel:

$$\Psi_i^{(Q)} = x_i \frac{G(Q-1,L)}{G(Q,L)},\ i = 1,...,L. \quad (4)$$

We will consider a formula for calculation of mathematical expectation of duration of queries processing in the system S_i of a network *N:*

$$\bar{u}_i^{(Q)} = \frac{1}{\mu_i}(\bar{s}_i^{(Q-1)} + 1),\ i = 1,...,L. \quad (5)$$

Remaining stationary characteristics of a network *N* can be written in the form:

$$\bar{s}_i^{(Q)} = \frac{\omega_i \bar{u}_i^{(Q)} Q}{\sum_{j=1}^{L} \omega_j \bar{u}_j^{(Q)}}, \quad (6)$$

$$\lambda_i^{(Q)} = \frac{\mu_i \bar{s}_i^{(Q)}}{(\bar{s}_i^{(Q-1)} + 1)}. \quad (7)$$

We will understand indices of efficiency of an information network as the characteristics reflecting a level of compliance of a network to the assignment, technical perfection and economic feasibility [2]. The concept of efficiency is connected to obtaining some useful result, namely to effect of use of a network. The index of efficiency is defined by process of functioning of a network and is some function of this process. It can be provided as follows:

$$W = W(t, LP, LTP, LA, LD, LU), \quad (8)$$

where W - a set of nodes of a network; t - time; LP, LTP, LA, LD, LU - sets of parameters of the entering flows of queries (LP), technical and software of a network (LTP), algorithms of processing and information transfer on a network (LA), activities of users (LD), operating conditions of a network (LU).

According to a specification of a concept of efficiency indices of a set of *W* can be divided into three groups: indices of target efficiency of a network; indices of technical efficiency of a network; indices of economic efficiency of a network.

The analysis of literature shows that the criterion of efficiency offered by the academician Shileyko A.V. for the characteristic of computers can be one of options

of assessment of any information systems and networks. Mathematically it can be expressed a formula of coefficient of technical efficiency:

$$\eta = \frac{I}{T \cdot \varphi}, \quad (9)$$

where I – the volume of the processed information; T – time of information processing of I; φ - structural complexity of the network providing processing of information of I during T.

The offered mathematical model of an information network allows not only to making recommendations about creation of a real network, but also can be used for implementation of a hardware and software system of simulation of interactive information networks.

References

1. ETSI TR 101 290 V1.2.1 (2001-05) // http://www.etsi.org.
2. Buzen J.P. Computational algorithms for closed queueing networks with exponential servers // Comm. ACM, 1973, Vol. 16, No. 9, P. 527-531.

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АНАЛИЗ CMS ПЛАТФОРМ. ВЫЯВЛЕНИЕ ДОСТОИНСТВ И НЕДОСТАТКОВ WEB – САЙТОВ

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Web-страницы обладают различным интерфейсом – совокупностью средств, при помощи которых пользователь взаимодействует со страницей. К сожалению, не все интернет-страницы являются удобными в использовании и, следовательно, имеют меньше шансов стать успешными и востребованными пользователями. Такие страницы подлежат коррекции в направлении дизайна и навигации.

Почти все сайты в Интернете построены на CMS платформах. Что такое CMS? CMS платформа – система управления контентом. Приведем в пример три самые популярные платформы и покажем их достоинства и недостатки.

Joomla

Продукт отличается качеством исполнения. Если пользователь ищет лучший движок CMS, то ему следует обратить внимание на Joomla. Пользователю доступны опции подключения многоуровневой авторизации администраторов и разделения прав модераторов. Изменение внешнего вида сайта осуществляется путем применения готового шаблона из обширного каталога. При желании можно создать индивидуальный макет. Многие клиенты считают, что это лучшая CMS для магазина, поскольку она позволяет подстроить под себя множество элементов.

Недостатки:

- слабая безопасность от взлома;