

THE PROBLEM SYNTHESIS ALGORITHMS FOR PREDICTING CONGESTIONS IN WIRELESS COMMUNICATION NETWORK

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At the current level of development wireless communication systems, the limited capacity of the radio channel acts as the main restraining factor. It is the bottleneck in cellular technologies and, what is unpleasant, has no clear prospects for resolution.

Measures have already been taken attempts to exploit the hitherto neglected degrees of freedom associated with multiple-input multiple-output (MIMO) and spatially selective reception technologies [1-6].

It should be noted that the prospects such methods, on the one hand, are quite limited, and on the other hand, they require high labor intensity during implementation. In such conditions, methods that allow optimal use of the available resource in the wireless communication network system acquire an important role. They are associated with a dynamic mode of adaptive adjustment to changing circumstances [3].

Indeed, along with the stationary component of traffic distribution between cells, as experience has shown, there is also a non-stationary component with a rather noticeable relative level.

Different wireless network cells may have significantly different peak hours.

It remains to clarify only the question of the relationship between such indicators as the number subscribers in a cell and the level of the requested load. Here, a variety models can be considered.

But the most natural, at least in the first approximation, seems to be a linear relationship between them.

In fact, a model is proposed that specifies the intensity of incoming subscriber requests in wireless communication networks [2, 3]:

$$\Lambda = \lambda(i - n_a), \quad (1)$$

where Λ – intensity of subscriber request flow; λ – удельная интенсивность абонентских запросов на работу в беспроводной сети связи; i – число абонентов в соте в данный момент времени; n_a – число активных абонентов в соте.

Expression (1) defines the linear law relationship between the number free subscribers and the intensity requests in wireless communication systems.

In this case, the proportionality coefficient of the linear communication model is λ . Active subscribers are excluded from the total number, since they, as a rule, can no longer be active in terms of creating new connections until they are free.

In the simplest case, the parameter λ can be considered constant. However, in the general case, it is appropriate to consider the situation when the behavior of λ is described by stochastic equations of "motion".

Taking into account all of the above, we can formulate the concept of effective traffic management and define the tasks associated with this concept that need to be solved in the work.

Let us introduce the concept of a functional P , which specifies the value of the channel resource required to provide communication services under given conditions for the main quality indicators, such as the probability of refusal of a service request and the probability of a connection "break" [3]:

$$P = W[M, D, G, \rho], \quad (2)$$

Such a functional and the channel resource value R determined by it – the number of available channels in the system, depend on the analytical form of the function W , which establishes a connection between the channel resource and parameters of the form: ρ – total serviced traffic, M – number of subscribers in the territory, G – acceptable probability of blocking a service request due to overload, D – upper threshold for the number of connection "breaks".

According to (2), effective traffic servicing should be called maintaining quality indicators at a given level with the minimum possible channel resource.

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