Optimization of circuit and constructive decisions and parameters, improvement of modes of operation and the maintenance service and repair organization is an overall objective of calculation of reliability of products of aviation technics.

Modern functional systems of the aircraft avionics systems, and especially - the complex technical systems, which consist of a large number of parts, assemblies and modules for different purposes, control devices, that is the functional systems of the aircraft consists of a large number of items.

Separation on the system is conditional and depends on the specific problem of calculation of reliability.

Possibility of decomposition of investigated functional system of any complexity on separate elements, for each of which it is possible to define reliability indicators, gives the chance to use in analytical methods of calculation structural models of reliability. Structurally-logic schemes which graphically display interrelation of elements and their influence on working capacity of system as a whole are such models.

Criterion for determining the type of connection elements (in series or in parallel) when constructing the structural logic is the degree of the impact of their failure on the performance of the system. Use in calculations of structural and logical laughter provides a mathematical expression - a function of communication, which determines the dependence of the reliability of the system reliability indices of its constituent parts.

At calculations of indicators of non-failure operation do such two assumptions:

1. All system and its any element can be only in one condition from two possible – efficient or disabled.

2. Refusals of elements don't depend one on another.

**System with series connection of elements**

Structural reliability model with a serial connection of elements is the most typical. These structural and logical schemes include all systems in which the failure of at least one element leads to loss of efficiency of the system.

Let's consider the consecutive scheme which consists of M of elements.

With each of I elements of system during any considered moment of time, that is at any operating time, two opposite events are connected:

• Event A - a usable state and element i, the probability of this event to a system will be pre-installed - R (A)  
• Event A – failure state of element I; the probability of the event Q (A) = 1 - R (A)

Based on the theorem of multiplication of probabilities of independent random events the probability of failure of the system in the considered time will be  
From these formulas we can conclude:

• Reliability of the functional diagram decreases with increasing number of series-connected cells, regardless of their level of reliability;  
• Reliability of the functional diagram for the connection cannot be higher than the non-repudiation of reliability of its elements (the "worst-worst").

System with a parallel connection of elements  
  
These include systems in which the failure of the system occurs only in the case of all of its elements. In systems with parallel structure uses the principle structural elements of the reservation system.  
Assuming that the failure of the element simple event, and the failure of the system - a complex, we use for this situation multiplication theorem of probability and, subject to the independence of failures, we write the analytical expression for the probability of system failure.

A type system L of S  
  
Name this type of structure contains a condition for its efficiency: With a system of parallel-connected elements of the performs its functions as long as the operating state is not less than N of its elements. Determination of operational state of each element of trust in the so-called quorum-element.  
Due to the fact that the system may not be workable and unworkable at the same time, these conditions are incompatible events, and the probability of failure of the system, respectively, the addition theorem of probability, will equal the sum of the probabilities of all working condition.  
  
Bridge structure  
  
Bridge structure cannot be reduced to a parallel or serial type compounds of the elements, it represents a parallel connection of elements with the diagonal elements included between nodes of different parallel branches.