The theoretical basis of bisignal formation of information flow in computer systems with open optical signals

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Abstract – **The theoretical basis of bisignal formation of information flow in computer systems (CS) with open optical signal (OOS) was proclaimed. Analytic expressions of signals attenuation in computer systems OOS with compensated multiplicative noise were determined.**

Keywords – **open optical signal, bisignal formation of information flow.**

I. INTRODUCTION

The development and optimization of the characteristics of the CS based OOS requires effective solution of the problem of multiplicative noise compensation arising as a result of atmospheric phenomena (fog, rain, snow, dust) as well as a violation of alignment laser emitters and optical receivers .

II. THE THEORETHICAL BASIS OF Biotic attenuation of signals

In Figure 1 shows the model of biotic signals attenuation, which are formed by two light sources with different damping coefficients.

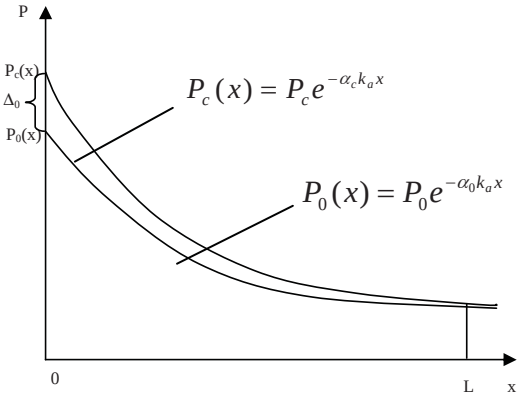

Figure 1. - Characteristics of bioptical signal attenuation in the atmosphere.

In a homogeneous optical medium the biotic signals attenuation degree described by equations Fig.1 [1].

On point $x = 0$ and x=L under conditions of convergence of functions $P_c(L)$ and $P_0(L)$ present them as:

$$P_c(0) = P_0(0) + \Delta_0(0);$$
$$P_c(L) = P_0(L) + \Delta_0(L),\ \Delta_0(L) \to 0. \qquad (1)$$

Exploring $P_c(L)$ and $P_0(L)$ can be noted that in point $x = L$ is equal

$$\alpha_c = \alpha_0. \qquad (2)$$

We hold that part of the modulating wave is taken into account during transmission by adding or subtracting the right side of (1) plug modulating Δ_c. Then expression (1) is transformed:

$$P_c(L) = P_c e^{-\alpha_c k_a L} \pm \Delta_c e^{-\alpha_c k_a L}; \qquad (3)$$
$$P_0(L) = P_0 e^{-\alpha_0 k_a L} - \Delta_0 e^{-\alpha_0 k_a L}. \qquad (4)$$

The deduction of expression (4) from expression (3), after appropriate simplification and consideration that $\Delta_0(L) \to 0$ we get the final expression for the difference of power which shows that:

$$P_c(L) - P_0(L) = \pm\Delta_c e^{-\alpha_c k_a L}. \qquad (5)$$

Depending on the parameters of noise that arise as a result of atmospheric phenomena (fog, rain, snow, dust) and a violation of alignment laser emitters and optical receivers, the functions $P_c(L)$ and $P_0(L)$ may vary only the value of modulating component after appropriate attenuation of the effective compensation of multiplicative noise.

III. CONCLUSION

The theoretical basis of biotic signals in a homogeneous atmospheric surrounding allows setting the compensation of multiplicative noise caused by atmospheric conditions and accurate positioning information signals. Solving this problem allows us using of optical signals at the differential receiver, which significantly increases the speed and range information transfer to the permissible error function in the traffic of computer networks..

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