

*Секція: Технічні науки*

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## **MAIN APPROACHES OF USING TECHNOLOGY BASED ON MULTIPLE INPUT MULTIPLE OUTPUT**

Information protection in all spheres of activity is becoming more relevant now. The growth of users and the volume of processed information within the information field, which must be protected, has significantly increased. One of the technologies that allows you to solve the problem of capturing large amounts of information without losing bandwidth in the network is a technology with multiple inputs and multiple outputs Multiple Input Multiple Output (MIMO). MIMO is a method [1-3] of spatial signal coding that allows to increase the bandwidth of the channel, in which the transmitting side uses two or more antennas and the same number of antennas for the receiving side. Simulations of different communication channels with MIMO systems are considered in [2-3], and the use of address-analog signaling to protect enterprises in [3].

Information security of the enterprise is a state of security of corporate data, which ensures their confidentiality, integrity, authenticity and accessibility. One of the biggest problems of the information society is the protection of information, as the data processed and accumulated by computers have recently begun to determine the direction of activity and many other aspects of life of

modern enterprises. With the help of illegal possession of information, you can commit a variety of illegal acts, such as trafficking in financial resources, access to classified commercial information. It should be noted that confidential information is of great interest to competing firms.

Automation of the data protection process is a key process in the organization of a full-fledged system of enterprise operation. Heterogeneous information security subsystems often interact poorly with each other, creating conflicts where there are a huge number of events and notifications. Analysis and response to information security events involve a significant human resource of this service, which is not always possible and rational.

On the one hand, we need enterprise security and process automation, and on the other hand we can't lose the speed of data transmission and information processing in such channels, so we consider the MIMO channel as the introduction of automatic alarm control subsystems for enterprise protection. One of the main ideas underlying the signal processing of space-time wireless MIMO systems, during which the natural size of digital communication data is supplemented by the spatial dimension inherent in the use of multiple distributed antennas, in the use of multiple antennas located at different points. Accordingly, wireless MIMO systems can be seen as a logical extension for smart antennas, which have been used for many years to improve wireless communication.

There are two main MIMO formats:

- 1) Spatial diversity: diversity of transmission and reception.
- 2) Spatial multiplexing: this form of MIMO is used to provide additional data capacity, by using different ways to transfer additional traffic, ie increase data throughput.

These two methodologies are used to improve the signal-to-noise ratio, and they are characterized by improved system reliability with respect to various

forms of fading. As a result of the use of several antennas, wireless MIMO technology can significantly increase the bandwidth of the channel [3].

Improving the characteristics of the speed of transmission and processing of information in communication channels based on MIMO systems is achieved through multi-element antennas, both on the transmitting and receiving side. MIMO technology reduces the probability of errors without reducing the baud rate. It is important to emphasize that MIMO technology is very well suited to the actively developed technology of multiplexing using orthogonal subcarriers Orthogonal frequency-division multiplexing (OFDM) so widely used in recent years. It is the OFDM-MIMO connection that has made it possible to obtain the growth of high-speed and noise-proof digital communication channels to date.

By increasing the number of receiving and transmitting antennas, you can linearly increase the bandwidth of the channel with each pair of antennas added to the system. This makes MIMO wireless technology one of the most important wireless technologies used in recent years. As spectral bandwidth becomes an increasingly valuable commodity for radio systems, methods are needed to make more efficient use of available bandwidth. MIMO wireless technology is one of these methods.

By increasing the transmission rate in the communication channel based on MIMO systems, the channel for the protection of analog-digital signaling information will have a data processing rate much higher than in channels with a single transmitting or receiving antenna. At the same time automatic control of such system will be provided with high speed and reliability.

### **References**

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