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ANALYTICAL OVERVIEW OF TECHNOLOGIES PLANNED FOR USE IN 5G/6G COMMUNICATION NETWORKS

Mobile networks are evolving rapidly to meet society's growing demand for fast and reliable data transmission. The fifth generation of mobile communications (5G) is already being gradually deployed around the world, and sixth generation (6G) technologies are on the horizon, expected after 2030 [1-6].

Theses review the key technologies that are the basis for the implementation of 5G and are planned for 6G.

Key technologies of 5G networks

Millimeter waves (mmWave) allow for ultra-high data rates of up to 10 Gbps. However, their coverage is limited and they are susceptible to interference, requiring a denser network of base stations.

Massive MIMO (Massive Multiple Input Multiple Output) is a technology that uses dozens of antennas at base stations to simultaneously transmit and receive signals, which increases bandwidth and spectrum efficiency.

Network Slicing helps divide the physical network into virtual segments to provide different types of services with different quality of service (QoS) requirements.

Small Cells are used to enhance the signal in densely populated areas or in closed spaces where traditional macrocells are ineffective.

Edge Computing involves processing data closer to the user to reduce latency and optimize network resources.

Potential technologies for 6G networks.

Terahertz (THz) 6G involves the use of frequencies from 100 GHz to 10 THz, which will provide incredible data transfer speeds of up to 1 Tbps. This will support applications such as holographic communications.

Artificial intelligence (AI) integration is planned for use in resource optimization, load forecasting, traffic management, and network service automation.

Satellite-enabled networks 6G technology plans to integrate satellite systems to provide global coverage, especially in hard-to-reach regions.

The Internet of Sensors and the Holographic Internet should provide a high density of connected devices, support for new types of content (3D/VR/AR) and even holographic information transmission.

One of the priorities will be to minimize the energy consumption of devices and network elements, which will reduce the impact on the environment.

Thus, the development of 5G networks and the prospects of 6G open a new era in the field of communications. The introduction of advanced technologies will significantly change everyday life, industry and scientific research. Although 5G is already actively used, 6G technologies promise to bring communication to a level that currently seems futuristic.

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МОДЕЛЮВАННЯ ОПЕРАТИВНО КЕРОВАНИХ ЗРОШУВАЛЬНИХ СИСТЕМ ЗА ДОПОМОГОЮ ПРОГРАМИ SWAP

На основі використання запропонованих в [1] наукових положень розроблені інтелектуальні інформаційні технології керування складними зрошувальними системами в умовах невизначеності [2, 3].

Інший можливий підхід полягає в застосуванні програми SWAP. Програма SWAP, яка розроблена у Вагенінгенському університеті (Голландія), імітує транспортування води, розчинених речовин і тепла в зоні аерації у взаємодії з розвитком рослинності. У вертикальному