

Special Issue on
Chaotic and Index Modulations: Emerging Paradigms for Future Wireless Communications

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The massive increase of wirelessly connected devices, i.e., Internet of Things (IoT) paradigm, is causing tremendous changes in future 5G networks. Namely, availability, connection density, cost, energy and spectral efficiency, latency, reliability, and security are some of the crucial requirements for future networks. Subsequently, development of new and innovative methods, which could handle these growing demands, is of particular importance.

In the last few decades, chaotic signals have attracted growing attention of the academic community for usage as wireless carriers. Namely, excellent properties of chaotic signals make them an attractive choice for systems where data security, spectrum utilization, low hardware complexity, high multipath, and jamming resistivity are crucial demands. However, some emerging 5G technologies, like IoT, push the available communication resources, like frequency spectrum, data rate, and multiuser capacity, to their limits. In this vein, chaotic signals are a promising solution for the aforementioned demands, because of their excellent properties.

Recently, index modulation has become a popular method for increasing spectral and energy efficiency of different communication systems. In particular, in index modulation, indices of the different system parameters are used to convey additional information bits. Therefore, the concept of index modulation provides an interesting solution for requirements of crowded, energy-efficient, and high data rate future networks.

In particular, index modulation is a universal method where its benefits can be exploited in any type of communication systems, which is confirmed by a rapid growth of researches in associated areas. Subsequently, the interest of index modulation usage with chaotic based communication systems has been widely adopted by the academic community in the past few years, in order to increase their performance.

The focus of this special issue is to look at ways to exploit the full potential of chaotic signals and index modulations in the different area of future wireless communications, which employs data security, efficient multiple access techniques, data rate, receiver design, etc.

Potential topics include but are not limited to the following:

- ▶ Coherent and noncoherent chaotic/index modulations
- ▶ Multiple access chaos/index based techniques
- ▶ Multicarrier chaos/index based systems
- ▶ Index modulation utilizing chaos
- ▶ Coded chaotic/index modulations
- ▶ Synchronization of chaotic signals
- ▶ Enhanced data security in chaotic systems
- ▶ Chaotic UWB communications
- ▶ Chaotic signals in 5G and IoT networks
- ▶ Advanced receiver design for chaotic/index modulations
- ▶ Chaotic/Index based MIMO modulations
- ▶ Application of chaotic/index modulation systems for cooperative communication systems
- ▶ Index modulation techniques for optical chaos wireless communications
- ▶ Index modulation based no-orthogonal multiple access, energy harvesting, and cognitive radio schemes

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