

Special Issue

Symmetry/Asymmetry in Wireless Communications and Signal Processing

Message from the Guest Editors

Wireless communication systems and signal processing techniques play a fundamental role in modern networks, in which the concepts of symmetry and asymmetry influence performance, resource allocation, and overall system design. Symmetry in wireless communications can manifest in balanced spectrum usage, equal power distribution, and uniform network structures, leading to simplified modeling and efficient optimization.

Conversely, asymmetry arises in real-world scenarios due to heterogeneous network topologies, diverse channel conditions, and varying user requirements, introducing new challenges and opportunities in system design. The interplay between symmetry and asymmetry fundamentally shapes wireless network functions, including channel estimation, interference management, adaptive modulation, and security protocols. For instance, time-division duplexing systems take advantage of symmetric uplink and downlink channel conditions, whereas frequency-division duplexing systems experience significant differences between uplink and downlink channels, resulting in asymmetry in channel estimation and feedback. Understanding and exploiting these characteristics...

Guest Editors

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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