

Real-Time Coverage Control with 1-Bit RISs for B5G/6G Wireless Networks

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Abstract

The possibility enabled by two-dimensional artificial materials to manipulate the reflection/transmission of electromagnetic (EM) waves according to the designer's specifications has been widely used in the last years for the implementation of various wireless systems such as reflect/transmit-arrays, lenses, beam splitters, absorbers, and wide-angle impedance matching layers. The popularity of such class of EM devices, which is due to the availability of both solid theoretical frameworks for their study and design and of relatively inexpensive fabrication processes for their implementation, has further increased in the last years because of their envisaged role in future wireless communication systems based on the Smart EM Environment (SEME) paradigm. As a matter of fact, the SEME vision is based on the possibility to manipulate / control the propagation scenario to constructively contribute to the resulting wireless system performance through the exploitation of suitable "artificial smart skins". Thanks to such a revolutionary approach, unprecedented opportunities are enabled to "tailor" the wave according to the communication requirements. In this Keynote talk, the recent advances regarding wave manipulation for real-time coverage control through minimum complexity Reconfigurable Intelligent Surfaces (RISs) will be illustrated, and the current trends and envisaged developments in the field will be presented.