IEEE Journal of Selected Topics in Signal Processing: Special issue on

Advanced Signal Processing for Reconfigurable Intelligent Surface-aided 6G Networks

Reconfigurable intelligent surface (RIS) or intelligent reflecting surface (IRS) has been widely regarded as one of the most promising techniques to deal with the blockage issue in mmWave communications. Particularly, RIS is a planar surface consisting of an array of passive reflecting elements, each of which can independently induce a controllable phase shift on the incident signal. By installing RIS on the walls or ceilings, a virtual line-of-sight (LoS) link between the mmWave base station (BS) and the users can be established that bypass the blockage between them. In addition, RIS is also appealing for applications in conventional sub-6 GHz communications. Specifically, by judiciously adjusting the phase shifts of the reflecting elements, the reflected signals can be constructively superimposed with those from the direct path to enhance the desired signal power or destructively to mitigate the deleterious signals such as co-channel interference or signal leakage to eavesdroppers. Since the reflecting elements of RIS only passively reflect the incoming signals without any signal processing operations that require radio-frequency (RF) chains, it has much lower implementation cost than conventional active transmitters. It can be fabricated with light weight and limited layer thickness, and thus can be readily integrated into the environment.

Although RIS has the above appealing advantages, it introduces some new signal processing challenges such as channel estimation, robust transmission design, angle/location estimation, distributed algorithm design, etc. The main goal of this special issue is to attract researchers to work together to address the new signal processing challenges arising in RIS-aided wireless communications. Topics of interest include (but are not limited to):

- Low pilot overhead channel estimation
- Robust transmission design based on imperfect cascaded channel state information (CSI)
- Robust design based on hardware impairment, i.e., low-resolution ADC/DAC
- Transceiver design based on long-term/two-time-scale CSI
- Distributed algorithms with low overhead exchange
- Angle/location estimation
- AI-based transmission design/channel estimation
- Association and coordination among RISs, base stations and users
- Resource allocation or interference management in RIS-aided wireless communications
- Application of RISs in mmWave/Terahertz
- RIS-aided massive MIMO systems
- Integration of RISs in emerging wireless applications (mobile edge computing, energy harvesting, UAV, physical layer security, etc.)

Submission Guidelines

Prospective authors should follow the instructions given on the IEEE JSTSP webpages and submit their manuscript through the web submission system.

Important Dates

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