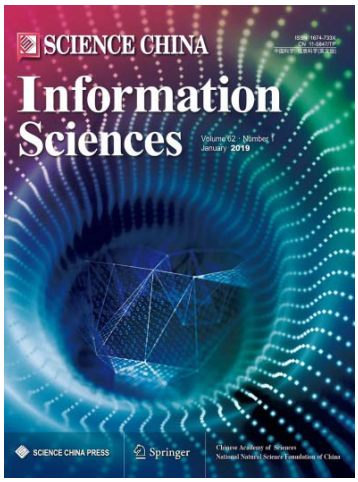
Call for Papers

Special Focus on
Ultra-Reliable Low-Latency Communications in Wireless Networks



Wireless communications is being applied to more and more areas, such as augmented and virtual reality, industrial control, automated driving or unmanned aerial vehicles, robotics, and tactile Internet. Human-operated terminals will be joined by a massive number of autonomous machines and devices. 5G and B5G networks are expected to support highly dynamic traffic and meet stringent delay requirements. As such, Ultra-Reliable Low-Latency Communications (URLLC) has been identified as one of the three major usage scenarios by ITU IMT-2020 , and it is expected that the reliability of one transmission of a 32 bytes packet should be at least 99.999% and the user plane latency at most 1 ms.

URLLC poses new research challenges to the design of future network protocols, core networks, channel and source coding, air interface, resource allocation and the integration with existing wireless communications systems. Much work has recently been carried out, but substantial effort still has to be made for theoretical study, standardization, system development, and testing. Novel designs in 5G and B5G systems should explicitly consider multi-target trade-offs, including throughput, latency, error rates and energy efficiency, to provide guaranteed quality of service. Recent advances in information theory such as finite block length codes offer an important reference for solving the above problems from one perspective, while the state-of-the-art open-loop communications theory provides another powerful strategy from traditional wireless communications for implementing URLLC as well as meeting more strict delay requirements for B5G systems. While there has been a surge of research efforts to address URLLC from various aspects, the gaps between theory and practice are still huge. It is still unclear how the theoretical results can be applied to guide the development of practical wireless systems that can support the stringent latency and reliability requirements. Moreover, the fundamental understanding of the multiuser and/or multi-hop URLLC networks is also lacking, which is imperative for B5G systems.

This special focus aims to bring together contributions from researchers and practitioners focusing on the above-mentioned challenges. These topics, together with fundamental advances in the underlying theory as well as real-world deployments of delay-constrained systems, form the core of this special issue. We therefore solicit papers on a variety of topics related to URLLC for 5G or B5G systems. Topics of interest include, but are not limited to, the following:

- Fundamental limits, performance analysis, and network theoretic approaches
- Optimized packet scheduling and resource allocation for URLLC
- New algorithms and implementation tools (such as machine learning)

- Analysis for tradeoffs between data rates, latency, error probability, and energy efficiency
- Open-loop communications networks
- Use cases and requirements for URLLC
- Distributed mobility management and network intelligence
- Non-orthogonal waveform design for URLLC
- Cloud-RAN concepts in the context of URLLC
- Finite block length codes for short packet transmission
- Protocol stack structures and procedures for URLLC
- Interference mitigation and management techniques for URLLC
- Interference, radio resource and mobility management
- Low latency industrial control.

Submission

The papers should be edited in the SCIS template, and should be submitted online through the manuscript submission system of the SCIENCE CHINA Information Sciences. The submission website is: https://mc03.manuscriptcentral.com/scis. You should choose **Special Focus on Ultra-Reliable Low-Latency Communications in Wireless Networks**. Information and guidelines on preparation of manuscripts are available on the journal website: http://scis.scichina.com.

Important Dates

Deadline for submission: Jan. 15, 2020
Notification of acceptance: March 1, 2020
Final submission: April 1, 2020
Publication: December 1, 2020

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