

Performance Analysis of Wireless Industrial Networks - Challenges and Trends

The increased deployment of wireless networks in industrial settings enhances the need to provide performance guarantees while at the same time demands resource-efficient network operation. Especially for multi-hop wireless networks, characterized by fading channels and queueing effects, an appropriate analytical framework to compute an end-to-end statistical delay guarantee is needed. Moreover, a transmit-power-efficient packet transmission is especially important in energy-limited networks or industrial settings with high coexistence management requirements.

This talk discusses the research challenges for such scenarios and elaborates how the mentioned aspects can be combined in order to obtain analytical formulation of multi-hop network performance under delay constraints. It further presents a delay bound-based optimal power allocation for heterogeneous wireless multi-hop networks.

Typical industrial applications which would benefit of such performance analysis in the process of network design are discussed in addition. The obtained results are illustrated via numerical examples, mostly for TSCH-like networks, for which the resulting network lifetime duration is compared towards a system optimum gained via simulations.