**Joint Power Control and Fronthaul Rate Allocation for Throughput Maximization in Broadband Cloud Radio Access Network**

Abstract:

The performance of cloud radio access network (C-RAN) is constrained by the limited fronthaul link capacity under future heavy data traffic. To tackle this problem, extensive efforts have been devoted to design efficient signal quantization/compression techniques in the fronthaul to maximize the network throughput. However, most of the previous results are based on information-theoretical quantization methods, which are hard to implement due to the extremely high complexity. In this talk, we consider using practical uniform scalar quantization in the uplink communication of a broadband C-RAN system, where the mobile users are assigned with orthogonal sub-carriers for multiple access. In particular, we consider joint wireless power control and fronthaul quantization design over the sub-carriers to maximize the system end-to-end throughput. Interestingly, we show that the joint optimization provides significant performance gain compared with either optimizing wireless power control or fronthaul quantization alone. Besides, we also show that the proposed simple uniform quantization scheme performs very close to the throughput performance upper bound, and in fact overlaps with the upper bound when the fronthaul capacity is sufficiently large. Overall, our results would help reveal practically achievable throughput performance of C-RAN, and lead to more efficient deployment of C-RAN in the next-generation wireless communication systems.

BIO:  
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