Projection methods in communication systems

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Abstract

Estimation and learning tasks in wireless networks are often posed as optimization, feasibility, or fixed-point problems. Given the ever increasing datarate demand of modern systems, these problems need to be solved in very short time (milliseconds), possibly in hardware with limited computational power. Furthermore, owing to the uncertainty of the wireless environment, these problems are constantly changing, so online methods are required. In this talk, we show that projection methods, or, more generally, iterative algorithms based on (quasi-)nonexpansing mappings, can address the above (and many other) challenges in next generation wireless networks. In particular, we will discuss our recent efforts to bring theoretical advances in the field of convex analysis and quasi-nonexpansive mapping theory to practical hardware.