Abstract

The work is on generalized MIMO interference networks, such as cooperative cellular networks. It is well known that the water-filling is the optimal input structure for single-user MIMO systems. What is the optimal Gaussian input structure for MIMO interference networks? The problem baffled researchers for more than a decade. As a result, single-user water-filling is sometimes used iteratively in networks with mediocre results. We give a polite water-filling structure that is optimal for general interference networks. It is polite because it strikes an optimal balance between reducing interference to others and maximizing a link’s own rate. Employing it, the related optimizations can be vastly simplified by taking advantage of the structure of the problems. Extensions to the work will also be discussed.