

Recent results have shown the benefits of widely linear precoding (WLP) in the MIMO interference channel (MIMO IC) assuming that all transmitters can follow the same strategy. Motivated by a transitional scenario where legacy linear transmitters coexist with widely linear ones, this work investigates the general K-user MIMO IC in a heterogeneous (linear and widely linear) transmitter deployment. In particular, we address the maximization of the weighted sum-rate (WSR) for (widely) linear transmit filters design through the use of the complex-valued formulation. Since the maximum WSR problem is non-convex, and thus difficult to be solved, we formulate an equivalent minimum weighted mean square error problem that allows deriving closed-form expressions for (widely) linear transceivers. Then an iterative procedure is proposed, which is proven to reach a stationary point of the maximum WSR problem. Simulations show that the proposed procedure allows increasing the sum-rate as compared to coordinated linear transceiver schemes. The gains are larger and significant in two different nonexclusive conditions: as the interference level increases or when the number of antennas is low.