

Abstract

By employing multiple antennas at the transmitter and the receiver sides, massive multiple input, multiple output (MIMO) schemes allow significant capacity gains. However, the implementation complexity inherent to the use of several tens or even hundreds of antennas might be too high, precluding the use of transmission techniques associated to conventional MIMO systems. In this paper we consider massive MIMO schemes employing 1-bit digital-to-analog converters (DACs) at the transmitter side. We present an analytical method for obtaining the statistical characterization of the transmitted signals. This statistical characterization allows a simple and accurate performance evaluation. It is shown that, although the nonlinear distortion effects associated to the use of 1-bit DACs can be very high, their impact on the system's performance can be minimized by employing more antennas at the transmitter side than at the receiver side. Therefore, massive MIMO systems with 1-bit DACs can be an interesting option for future broadband wireless systems.