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Hybrid precoding design using MMSE baseband precoder for mm-wave multi-user MIMO systems (Article) [\(Open Access\)](#)

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Abstract

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For future 5G wireless communication networks, millimeter-wave (mmWave) cellular systems is considered to be the key enabling technology because of its high data rates, low latency, high system capacity, and huge available bandwidths. However, multiuser networks in mmWave frequency bands encounter high path loss and interference, thus degrading the performance. Applying large antenna arrays at the base stations (BS) in order to achieve high beamforming gains with the help of precoding techniques is an efficient way of improving the performance of the system. Although multi-user beamforming can improve spectral efficiencies, full digital beamforming strategies used in the conventional microwave systems increase the hardware cost and consumes high power for large number of antennas in mmW systems. In this paper, a low-complexity multi-user hybrid precoding structure is proposed for mmWave multiple input multiple output (MIMO) channels utilizing Minimum Mean Square Error (MMSE) precoders at the BS with perfect channel knowledge. Simulations show that the achievable rate obtained by the proposed hybrid precoding scheme is very close to the single-user rate and also performs better compared to other hybrid precoding approaches. © BEIESP.

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