OFDMA/SC-FDMA Aided Space–Time Shift Keying for Dispersive Multiuser Scenarios

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Abstract:
Motivated by the recent concept of space–time shift keying (STSK), which was developed for achieving a flexible diversity versus multiplexing gain tradeoff, we propose a novel orthogonal frequency-division multiple access (OFDMA)/single-carrier frequency-division multiple-access (SC-FDMA)-aided multiuser STSK scheme for frequency-selective channels. The proposed OFDMA/SC-FDMA STSK scheme can provide an improved performance in dispersive channels while supporting multiple users in a multiple-antenna-aided wireless system. Furthermore, the scheme has the inherent potential of benefitting from the low-complexity single-stream maximum-likelihood detector. Both an uncoded and a sophisticated near-capacity-coded OFDMA/SC-FDMA STSK scheme were studied, and their performances were compared in multiuser wideband multiple-input–multiple-output (MIMO) scenarios. Explicitly, OFDMA/SC-FDMA-aided STSK exhibits an excellent performance, even in the presence of channel impairments due to the frequency selectivity of wideband channels, and proves to be a beneficial choice for high-capacity multiuser MIMO systems.

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