

# Abstract

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## **A New Wavelet Space Time Coding Technique Designed for UWB MISO Systems**

A new MISO-STC scheme designed specifically for Ultra-Wideband (UWB) systems is introduced in this paper. The proposed scheme is based on multiplexing multiple symbols in the wavelet domain of the UWB pulses in addition to the spatial multiplexing offered by using multiple transmitting antennas. Rake receivers are used to collect the energy in the dense multipath channel components. The suggested technique is referred to as the wavelet space time coding scheme (WSTC). In WSTC four symbols are transmitted on the same UWB transmission pulse with the same bandwidth, symbol duration, and number of transmitting antennas of the conventional MISO-STC scheme. The used mother wavelet (MW) is selected to be highly correlated with transmitted pulse shape and such that the multiplexed signal has almost the same spectral characteristics as those of the original UWB pulse. The simulation results show that the proposed WSTC scheme has better performance than the conventional scheme in addition to increasing the data rate to four times that of the conventional STC scheme.