REDUCED COMPLEXITY RECEIVER FOR SPACE-TIME-BIT-INTERLEAVED CODED MODULATION

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See application file for complete search history.

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ABSTRACT

A system employs space-time coding characterized at the transmitter by bit-interleaved coded modulation (BICM) combined with modulating several streams of the BICM encoded data for transmission over two or more antennas. Space-time coding techniques improve transmission efficiency in radio channels by using multiple transmit and/or receive antennas and coordination of the signaling over these antennas. Bit-interleaved coded modulation provides good diversity gain with higher-order modulation schemes that employ binary convolutional codes. A receiver demodulates the received signals and applies multi-input, multi-output (MIMO) demapping to estimate the BICM encoded bitstream. After deinterleaving of the BICM encoded bitstream, maximum a posteriori (MAP) decoding is applied to the resulting bit stream to generate soft output values. By applying well-known turbo-decoding principles to iteratively demap and decode, the overall receiver performance is significantly improved. The MIMO demapping and MAP decoding processes exchange likelihood information to improve the bit error rate performance over several iterations of demapping/decoding. By generating tentative decisions for transmitted bits, the overall number of evaluations used for demapping may be reduced.

17 Claims, 5 Drawing Sheets