Blind Estimation of OFDM Frequency Offset via Oversampling

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Invention

Orthaganol frequency division multiplexing (OFDM) is a popular method for wideband digital communication due to its inherent immunity to multipath fading through the use of multiple subcarriers and expanded symbol interval. However, any frequency difference between the transmitter and receiver will cause inter-carrier interference, significantly impairing performance. OFDM is highly sensitive to frequency offset, and this is an important limiting factor of the technology. Thus, it is critical to mitigate frequency offset in OFDM systems. This technology comprises an efficient method of estimating frequency offset in order to enable complete mitigation of inter-carrier interference.

Technology

U.S. Patent No. 7,355,958

A matrix is constructed from two received signals, and a singular value decomposition is performed to produce left and right singular matrices. The right singular vector corresponding to the smallest singular value of the matrix is determined, yielding the channel impulse response multiplied by an unknown scalar constant. The scalar is then removed using known techniques.

Application

Frequency offset mitigation in wireless OFDM communication systems.

Advantages

- Blind – no system bandwidth required
- Independent of input symbol constellation
- Data efficient
- Computationally efficient
- Suitable for both frequency selective and frequency non selective channels
- More robust to time variation
- Minimal delay

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