Abstract

In this paper, we deal with the challenges regarding the provision of Inter Carrier interference (ICI) and Peak-to-Average Power Ratio (PAPR) for the performance evaluation of Multiple-Input and Multiple-Output Orthogonal Frequency Division Multiplexing (MIMO-OFDM). We propose a Non-linear Companding Technique (NCT) based on the inverse hyperbolic cosine function for PAPR reduction in OFDM symbol. Orthogonality among subcarriers is maintained and PAPR performance is achieved simultaneously by combing NCT and ICI cancellation techniques. Carrier to interference ratio (CIR) remains unchanged and extra Side Information (SI) is not required to recover the original signal as in the case of PTS and SLM techniques. Simulation results support BER improvement over existing methods in Additive White Gaussian Noise channel.

References

- M Sandell, J Coon, Near-optimal training sequences for MIMO OFDM systems with
nulled subcarriers.  in Proc. IEEE Global Telecommunications Conference GLOBECOM 
aapos;05, vol. 4, 2243–2249, (2005)
- Q Huang, M Ghogho, S Freear, Pilot design for MIMO OFDM systems with virtual 
- Physical Layer Aspects for Evolved UTRA, Std.  TR 25. 814, Rev.  7. 1. 0, Sep.  2006.
- IEEE Standard for Local and Metropolitan Area Networks Part 16: Air Interface for Fixed 
and Mobile Broadband Wireless Access Systems Amendment 2: Physical and Medium Access 
Control Layers for Combined Fixed and Mobile Operation in Licensed Bands and Corrigendum 
- B Rihawi, Y Louet, S Zabre, PAPR reduction scheme with SOCP for MIMO-OFDM.  in 
Proc. Int.  Conf.  Wireless Communications, Networking and Mobile Computing WiCom 2007, 
- van de Beek, J.  J. , Sandell, M. , & Borjesson, P.  O.  (1997).  ML estimation of time and 
frequency offset in OFDM systems.  IEEE Transactions on Signal Processing, 45(7), 
1800–1805.
high-resolution OFDM carrier frequency offset estimator.  IEEE Transactions on Vehicular 
Technology, 50(2), 629–643.
Frequency offset correction for coherent OFDM in wireless systems.  IEEE Transactions on 
frequency recovery for OFDM signals over frequency-selective radio channels.  IEEE 
Transactions on Communications, 50(7), 1182–1188.
frequency nonselective Rayleigh fading channels.  IEEE Electronics Letters, 29(16), 
1476–1477.
- Wang, C.  L. , & Huang, Y.  C.  (2010).  Inter Carrier interference cancellation using 
general phase rotated conjugate transmission for OFDM systems.  IEEE Transactions on 
Communications, 58(3), 812–819.
- X.  B.  Wang, T.  T.  Tjhung, and C.  S.  Ng, &quot;Reduction of peak-to-average power 
ratio of OFDM system using a companding technique,&quot;  IEEE Trans.  Broadcast. , vol.  45, 
- Shiann-Shiun Jeng, Member, IEEE, and Jia-Ming Chen, Student Member, IEEE,&quot; 
Efficient PAPR Reduction in OFDM Systems Based on a Companding Technique with 
Trapezium distrubition&quot;:,  IEEE TRANSACTIONS ON BROADCASTING, VOL.  57, NO.  2, 
JUNE 2011
- Yong Wang, Jianhua Ge, Lihua Wang, Jing Li, &quot;Reduction of PAPR of OFDM 
Signals Using Nonlinear Companding Transform&quot; Springer Science+Business Media, 
LLC.  2012

Index Terms

Computer Science  Signal Processing
Keywords
Multiple-Input and Multiple-Output Orthogonal Frequency Division Multiplexing (MIMO-OFDM) Inter Carrier interference (ICI) Peak-to-Average power ratio (PAPR) and Non linear Companding Transform (NCT). Carrier to Interference ratio (CIR) Bit Error Rate (BER).