Design of Blind Reduced-Rank Adaptive Mobile Receiver for UWB System Over Multipath Fading Channel

陳俊鴻、武維疆
E-mail: 9706838@mail.dyu.edu.tw

ABSTRACT

This paper deals with the design of blind (without exploiting training sequences and undesired users' TH codes) reduced-rank adaptive mobile receiver applying in ultrawideband (UWB) communication system. We first employ constrained optimization technique to design a batch-mode blind mobile receiver. To reduce the computational complexity and reflect the dense arrivals of multipath component (MPC) in indoor channel, we propose a Generalized Sidelobe Canceller (GSC) based blind adaptive receiver. The algorithm jointly and iteratively optimizes the weight vector and channel impulse response (IR) to improve system performance. Simulation results show that the proposed adaptive receiver converges to the optimum batch mode receiver. Moreover, the algorithms are shown to be robust to multi-user interference (MUI) and near-far problems.

Keywords : Multi-user interference ; Minimum-output-energy ; Ultra wideband ; Generalized Sidelobe Canceller

Table of Contents

封面內頁 簽名頁 授權書.........................iii 中文摘要............iv 英文摘要........................v 誌謝.................vi 目錄..........................vii 圖目錄......................ix 表目錄.........................xi 第一章 總論......................1 1.1 研究動機..................1 1.2 研究方法..................2 1.3 內容大綱..................3 第二章 UWB通訊系統..................4 2.1 簡介....................4 2.1.1 近期UWB之發展............4 2.1.2 UWB的優點..............5 2.1.3 UWB和其他通訊技術的比較.......8 2.1.4 UWB的應用..............13 2.2 UWB的定義...........15 2.3 脈波調變..................17 2.3.1 脈波波形...............18 2.3.2 Time-Hopping PAM調變方式.......19 2.4 多重路徑..................21 第三章 適應性訊號處理介紹...............22 3.1 MPDR beamforming演算法..........22 3.2 LCMP演算法................26 3.3 GSC演算法.................28 3.4 Gradient search 34 第四章 設計下鏈盲蔽式降低維度之適應性行動台接收機...41 4.1 簡介...................41 4.2 信號模型..................41 4.3 設計行動台接收機.............43 4.3.1最小輸出能量(MOE)接收機.......43 4.3.2盲蔽式通道估計演算法.........47 4.4遞歸式MOE接收機..............49 第五章 參數設定和模擬結果...............57 5.1 簡介..................57 5.2參數設定..................57 5.3模擬結果..............58 第六章 結論......................70 參考文獻....................72

REFERENCES


