Multiuser Detection And Blind Channel Estimation for Time-Hopping PAM UWB MIMO Systems

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ABSTRACT

This thesis is based on time-hopping (TH) pulse amplitude modulation (PAM) in Ultra-Wideband (UWB) impulse radio (IR) communication system, and mainly divides into two parts：multiuser detection and blind interference suppression. We apply a class of linear multiuser detectors (LMDs) to extract the information bits while suppress multi-access interference (MAI) even in the presence of multipath fading. Morever, we develop three types of mobile station (MS) receivers. One is matched-filter (MF) receiver and minimum output energy (MOE) receiver as well as zero-forcing (ZF) receiver. However, since accurate channel information is crucial for reliable operation, thereby we propose a blind (non-data aided) channel estimator. The numerical and analytical results demonstrate that zero-forcing (ZF) receiver not only multi-access interference and near-far problem can be suppressed effectively but also system performance is comprehensively improved.

Keywords : Ultra-wideband(UWB) ; Time-hopping(TH) ; Linear multiuser detector(LMD) ; multi-access interference(MAI) ; Blind estimation ; zero-forcing(ZF)

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