ABSTRACT

In the OOK-CDMA system with an OOC on non-directed indoor wireless infrared channels, performance degradation due to multi-user interference is serious as the number of users increases. This is because the transmitted power is concentrated on the mark position of the OOC so that the asynchronous signal of undesired user increasingly interferes with the desired user signal as the number of users increases. In addition, since the unipolar sequence is employed as spreading and de-spreading sequence the receiver must adjust the optimal threshold dependent on the average received power. Therefore the complexity of the OOK-CDMA system with an OOC increases due to the need for an estimator of the average received power.

In this thesis, to overcome above mentioned weakness of the OOK-CDMA system with an OOC the sequence inverse keyed (SIK) OOK-CDMA system is proposed on non-directed indoor wireless infrared channels and the performance of proposed system is analyzed and compared with that of the OOK-CDMA system using an OOC.

It is shown that the SIK OOK-CDMA system is more effective than the OOK-CDMA system with an OOC in mitigating the effects of multi-user interference because the average transmitted power is distributed to the unipolar sequence of m-sequence. Moreover, in the proposed system the original data is recovered by the zero-level threshold detector, since the bipolar signature sequence such as m-sequence which have been used for the most of radio frequency CDMA system is employed as despreading code. Accordingly, from the reliability and complexity the SIK OOK-CDMA system is more
practical than the OOK-CDMA system with an OOC on non-directed indoor wireless infrared channels.

Key words: indoor wireless infrared communication, sequence inverse keying, OOK-CDMA