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论文

基于无碰撞区跳频序列的两级FFH / MFSK 系统

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摘要:

为提高系统容量,提出了一种基于无碰撞区(NHZ)跳频序列的两级FFH/ MFSK 系统(称为NHZ/ FFH系统). 系统中全体用户被分成若干组,每组分配一个互不相同的NHZ 跳频序列. 由于NHZ 跳频序列的汉明互相关在NHZ 内等于0,只要用户间相对延迟不超过无碰撞区,就可以消除组间用户的干扰,多址干扰只来源于同一组内的用户. 通过采用适于异步系统的多用户检测器,可以进一步提高系统的检测性能,且多用户检测器的规模和复杂度只与组内用户数有关. 结合系统模型进行了干扰分析和仿真研究,结果表明,与现有MS/ FFH 系统相比,在相同的信道条件下,对于相同的误码率级别,NHZ/ FFH 系统支持的用户数多.

关键词: FFH/ MFSK 系统 无碰撞区跳频序列 多用户检测

Two-Stage FFH / MFSK System Based on Frequency Hopping Sequence with No-Hit Zone

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Abstract:

To improve system capacity, a two-stage FFH/ MFSK (fast frequency hopping/ multilevel frequency-shift-keying) system based on frequency hopping sequence with no-hit zone (NHZ), named as NHZ/ FFH system, was proposed. In this system, users are divided into a number of groups, and each group is assigned a unique NHZ FH (frequency hopping) sequence. Because the cross-correlations of NHZ FH sequences are equal to zero within no-hit zone, the multiple-access interference (MAI) between users of different groups can be eliminated as long as their relative delays do not exceed the no-hit zone. Therefore, MAI is only imposed on users belonging to the same user group. Furthermore, the multiuser detection scheme used in an asynchronous system is utilized to improve the detection performance, and the size and complexity of the multiuser detector are only decided by the number of users within a group. Interference analysis and simulation were carried out based on the system model. The simulation results show that compared with the existing MS/ FFH system, the number of users supported by the proposed NHZ/ FFH system is great for the same BER (bit error rate) level under the same channel condition

Keywords: FFH/ MFSK system frequency hopping sequence with no-hit zone multiuser detection

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