

## 研究论文

### LTE-A超远覆盖中的随机接入前导码设计与性能

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#### 摘要:

针对移动通信先进长期演进系统在超远覆盖下基站与用户通信距离大、传播时延长导致的上行失步问题,提出一种随机接入前导码的设计方法.该方法将两个不同的Zadoff-Chu根序列级联形成新的前导序列,并通过扩展循环前缀和保护间隔,构造出支持超远覆盖的随机接入前导码.在此基础上,推导了所设计前导序列的自相关性和互相关性,并分析了随机接入前导码的覆盖性能.理论分析与仿真表明,所设计的前导序列仅仅在时延为零时周期自相关出现高数值,且构造的随机接入前导码能够大大提高覆盖范围.

关键词: 移动通信先进长期演进 超远覆盖 随机接入 Zadoff-Chu序列

### Design and performance of the random access preamble structure for LTE-A super long-range coverage

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#### Abstract:

Aiming at the uplink out-of-synchronization problem due to the long distance and the high delay between the eNodeB and the UE, a random access preamble structure is presented for the long term evolution-advanced(LTE-A) super coverage. The random access preamble structure is a new preamble sequence constructed by two different cascading Zadoff-Chu root sequences followed by the expanded cyclic prefix and guard time. Furthermore, the period auto-correlation and cross-correlation of the proposed preamble is derived and the coverage performance is analyzed. Theoretical analysis and simulation results show that the auto-correlation of the proposed preamble reaches its peak only when the delay is zero, and the coverage range is greatly improved by using the proposed preamble.

Keywords: long term evolution-advanced super long-range coverage random access Zadoff-Chu sequence

收稿日期 2012-05-11 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1001-2400.2013.05.007

#### 基金项目:

国家自然科学基金资助项目(60702060); 国家重大科技专项资助项目(2012ZX03001027); 中央高校基本科研业务费资助项目(K50510010016); 111引智基地资助项目(B08038)

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