

下行链路基站协同蜂窝系统中的功率分配和干扰消除方法

艾婷, 武卓

上海大学 通信与信息工程学院, 上海 200072

Power Allocation and Interference Mitigation Schemes for Cellular System with Base Station Cooperation on the Downlink

AI Ting, WU Zhuo

School of Communication and Information Engineering, Shanghai University, Shanghai 200072, China

- [摘要](#)
- [参考文献](#)
- [相关文章](#)

Download: [PDF \(2860KB\)](#) | [HTML \(1KB\)](#) | Export: [BibTeX](#) or [EndNote \(RIS\)](#) | [Supporting Info](#)

摘要 蜂窝间干扰是无线蜂窝网络中一个重要的性能瓶颈, 基站协同可以消除小区边缘用户受到的严重的蜂窝间干扰, 提高蜂窝系统的性能和频谱效率. 针对下行链路基站协同通信系统, 提出一种信道衰落补偿功率分配方法, 以及内部联合分布式空时编码(inner joint distributed space-time coding, IN-J-DSTC) 基站协同传输方案, 以抑制蜂窝边缘用户受到的严重的蜂窝间干扰. 仿真结果表明, 该方法可以根据信道状况, 在源基站及协同基站间自适应地分配信号发送功率, 同时明显消除蜂窝边缘用户所受到的蜂窝间干扰, 从而显著地提高系统的误码率性能.

关键词: [共信道干扰](#) [内部联合分布式空时编码](#) [预编码](#) [多蜂窝协同](#) [功率分配](#)

Abstract: Capacity of a cellular system on the downlink is significantly limited by inter-cell interference (ICI), especially at the cell boundary. Multi-cell joint processing can mitigate ICI and thereby greatly improve performance and spectral efficiency of cellular systems. This paper considers a cellular system with base station (BS) cooperation on the downlink and propose an adaptive power allocation scheme to compensate the channel fading effect. Further, a BS cooperation transmission method is proposed to remove ICI experienced by cell boundary users. The method is inner joint distributed space-time coding (IN-J-DSTC) BS cooperation transmission with pre-coding. Simulation results show that the bit error rate (BER) performance can be significantly improved by effectively suppressing ICI with the proposed BS cooperation schemes and by allocating transmit power adaptively between the source and the cooperative BS according to the channels between them and the destination.

Keywords: [co-channel interference](#), [inner joint distributed space-time coding \(IN-J-DSTC\)](#), [precoding](#), [multicell cooperation](#), [power allocation](#)

收稿日期: 2012-10-18;

基金资助:

国家自然科学基金资助项目(60972055); 上海市教委基金资助项目(09CG40); 上海市重点学科建设资助项目(S30108); 上海市科委重点实验室资助项目(10220710300)

通讯作者 武卓(1981—), 女, 副教授, 博士, 研究方向为无线通信. Email: zwu@shu.edu.cn


引用本文:

.下行链路基站协同蜂窝系统中的功率分配和干扰消除方法[J] 上海大学学报(自然科学版), 2013,V19(3): 259-265

.Power Allocation and Interference Mitigation Schemes for Cellular System with Base Station Cooperation on the Downlink[J] J.Shanghai University (Natural Science Edition), 2013,V19(3): 259-265

链接本文:

<http://www.journal.shu.edu.cn//CN/10.3969/j.issn.1007-2861.2013.03.009> 或 <http://www.journal.shu.edu.cn//CN/Y2013/V19/I3/259>







[1] Somekh O, Zaidel B, Shamai S. Sum rate characterization of joint multiple cell-site processing [J]. IEEE Trans Inf Theory, 2007, 53: 4473-4497. 

[2] Zhou S, Gong J, Niu Z S. A decentralized framework for dynamic downlink base station cooperation [C]// IEEE Global Telecommunications Conference. 2009: 1-6.

Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

作者相关文章

- [3] Lee N, Lee K, Nam E. Base station selection technique for MMSE joint transmission in downlink cooperative MIMO system [C]// IEEE Wireless Communications and Networking Conference. 2009: 1-5.
- [4] Wiese M, Boche H, Bjelakovic I. Downlink with partially cooperating base stations [C]// IEEE Eleventh International Workshop on Signal Processing Advances in Wireless Communications. 2010: 1-5.
- [5] Xu J, Choi J, Seo J. Distributed space-time coding and equalization for cooperative cellular communications system [J]. IEEE Transactions on Consumer Electron, 2008, 54(1): 47-51. 
- [6] Laneman J N, Wornell G W. Distributed spacetime coded protocols for exploiting cooperative diversity in wireless networks [J]. IEEE Trans Inf Theory, 2003, 49(10): 2415-2425. 
- [7] Ai T, Wu Z. Interference mitigation for downlink base station cooperation with joint distributed spacetime coding [C]// 2011 IET International Communication Conference on Wireless Mobile & Computing. 2011: 201-206.
- [8] Zhao L, Mark J W, Ding J. Power distribution/allocation in multirate wideband CDMA systems [J]. IEEE Transactions on Wireless Communications, 2006, 5(9): 2458-2467. 
- [9] Zhang J, Zha Q, Shao C, et al. Adaptive optimal transmit power allocation for two-hop nonregenerative wireless relay system [C]//Proc IEEE Vehicular Technology Conf. 2004: 1213-1217.
- [10] Pirak C, Wang Z J, Liu K J R. An adaptive protocol for cooperative communications achieving asymptotic minimum symbol-error-rate [C]// Proceedings IEEE Acoustic, Speech and Signal Processing. 2006: IV53-IV56.
- [11] Maham B, Hjørungnes A. Power allocation strategies for distributed space-time codes in amplify-andforward mode [J]. Eurasip J Adv Signal Process, 2009: 1-14.
- [12] Spencer Q H, Swindlehurst A L, Haardt M. Zero-forcing methods for downlink spatial multiplexing in multiuser MIMO channels [J]. IEEE Trans on Signal Processing, 2004, 52(2): 461-471. 
- [13] Xu M, Guo D, Honig M L. Two-cell downlink noncoherent cooperation without transmitter phase alignment [C]//Proceedings of IEEE GLOBECOM 2010. 2010: 1-5.
- [14] Alamouti S M. A simple transmitter diversity scheme for wireless communication [J]. IEEE J Sel Areas Commun, 1998, 16(8): 1451-1458. 
- [15] Sharma N, Geraniotis E. Analyzing the performance of the space-time block codes with partial channel state feedback [C]//Proceedings of IEEE Wireless Communications and Networking Conference. 2000: 1362-1366.
- [16] Tarokh V, Jafarkhani H, Calderbank A R. Space-time block coding for wireless communications: performance results [J]. IEEE Journal on Selected Areas in Communications, 1999, 17(3): 451-460. 
- [1] 古强1, 许小东1, 蒋轶2, 戴旭初1.适合传输三路数据流的最小距离MIMO预编码[J].上海大学学报(自然科学版),2013,31(2):135-141
- [2] 葛泉, 芮赟, 金彦亮, 李明齐, 石志东.LTE-Advanced上行SC-FDMA MIMO系统的信干噪比性能分析[J].上海大学学报(自然科学版),2012,18(2):117-121
- [3] 武卓, 杨洪兵, 郑国莘.多中继放大转发协同通信系统功率分配方法[J].上海大学学报(自然科学版),2012,18(1):20-25
- [4] 唐伦, 蒋广健, 陈前斌.解码转发中继网络基于OFDMA的低复杂度资源分配[J].上海大学学报(自然科学版),2011,29(5):441-446
- [5] 王凡1;2, 赵杭生2, 姚富强2, 冯少栋1, 张建照1;2.基于定价的认知无线网络按需多信道接入策略[J].上海大学学报(自然科学版),2011,29(4):353-359
- [6] 高献坤, 崔岩, 傅洪亮.连续迭代优化SLNR准则的下行多用户MIMO预编码[J].上海大学学报(自然科学版),2011,29(3):251-255
- [7] 石海, 周健.放大转发协同通信的功率分配[J].上海大学学报(自然科学版),2011,17(2):115-118
- [8] 韩东升1;3, 杨维1;2, 许昌龙2.基站协作系统中基于误差修正的有限量化反馈设计[J].上海大学学报(自然科学版),2011,29(1):9-14
- [9] 张才华 许威 陈明.下行多用户MIMO系统中的低复杂度用户选择[J].上海大学学报(自然科学版),2009,27(4):331-336
- [10] 孙欢;王新宇;王炎;尤肖虎.块对角化预编码MIMO系统多用户调度[J].上海大学学报(自然科学版),2008,26(6):551-555
- [11] 仲崇显;杨绿溪.有限反馈的MIMO系统下行链路用户调度与功率分配[J].上海大学学报(自然科学版),2007,25(6):551-551