A Novel Cooperative Non-Orthogonal Multiple Access (NOMA) in Wireless Backhaul Two-Tier HetNets

ABSTRACT

In this work, we propose to re-engineer the wireless backhaul two-tier heterogeneous networks architecture by developing a novel cooperative transmission scheme based on non-orthogonal multiple access (NOMA). To effectively manage severe interference from the newly introduced backhaul communications, we employ the cochannel time division duplexing combined with spectrum partitioning between two considered tiers. Numerical results are extensively studied to corroborate that our proposed strategy outperforms the conventional designs in terms of total achievable rate and number of satisfied users.

EXISTING SYSTEM

- In existing system, polyblock optimal algorithm based on the monotonic branch-and-bound algorithm and low complexity successive convex approximation algorithm to solve the problem optimally and sub-optimally.
- Similarly, also adopted the monotonic branch-and-bound algorithm and developed a low complexity algorithm based on difference of convex (D.C.) programming to solve for global optimal and sub-optimal solutions.

PROPOSED SYSTEM

- A novel transmission scheme based on cooperative NOMA to aim at redesigning the WB two-tier HetNets system.
- By employing the CoTDD combined with spectrum partitioning scheme, we introduced two optimization problems which jointly design the NOMA decoding order together with the downlink transmit beamforming and power allocation at the MBS and SCAP to maximize the two objectives.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

REFERENCE

[1] J. G. Andrews et al., “What will 5G be ?” IEEE J. Sel. Areas Commun., vol. 32, no. 6, pp. 1065–1082, Jun. 2014.

[2] P. Kela, J. Turkka, and M. Costa, “Borderless mobility in 5G outdoor ultra-dense networks,” IEEE Access, vol. 3, pp. 1462–1476, Aug. 2015.

[3] V.W.Wong, R. Schober, D.W. K. Ng, and L. C.Wang, Key Technologies for 5G Wireless Systems. Cambridge University Press, 2017.

[4] N. Bhushan et al., “Network densification: The dominant theme for wireless evolution into 5G,” IEEE Commun. Mag., vol. 52, no. 2, pp. 82–89, Feb. 2014.

[5] X. Ge, H. Cheng, M. Guizani, and T. Han, “5G wireless backhaul networks: challenges and research advances,” IEEE Network, vol. 28, no. 6, pp. 6–11, Nov. 2014.