

Document details

< Back to results | 1 of 2 Next >

[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More...](#)

[Full Text](#) [View at Publisher](#)

Elektronika ir Elektrotehnika
Volume 23, Issue 5, 2017, Pages 89-93

Outage probability analysis of Co-Tier interference in heterogeneous network (Article)

Hasan, M.K.^{ab} [✉](#), Ismail, A.F.^b, Hashim, W.^c, Islam, S.^d, Hashim, A.-H.A.^b

^aDepartment of Electrical and Electronics Engineering, University Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia

^bDepartment of Electrical and Computer Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, Malaysia

^cCollege of Computer Science and Information Technology, University Tenaga Nasional, Malaysia

[View additional affiliations](#) ∨

Abstract

[View references \(19\)](#) ∨

In Heterogeneous Network (HetNet), the femtocell (HeNB) has been deployed by the telecommunication industries to provide extensive coverage as well as capacity in an indoor. These HeNBs are Customer Premise Equipment (CPE) which is randomly used in co-channel with macrocell (MeNB) and causes the Co-Tier Interference (CTI) in OFDMA. The effect of CTI in OFDMA systems can lead the system throughput degradation and service disruption. Because of quick direct changing features in Rayleigh channel, it is compulsory to succeed the satisfactory performance. The signal-to-interference noise ratio (SINR) is arbitrary which drives the highest capacity to be an irregular variable. However, this paper derives the expressions of outage probabilities based on the hybrid Genetic Algorithm (GA) with biogeography based dynamic subcarrier allocation (HGBBDSA) algorithm is implemented in reducing the outage probability. The outage probability countenance is expressed for the moment-generating function of the total SINR at the receivers end. The simulation results demonstrate that the HGBBDSA can lessen the outage to 45 % than existing methods.

Author keywords

Co-tier interference Heterogeneous network HGBBDSA LTE-A OFDMA

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
	Ministry of Higher Education, Malaysia	MOHE	See opportunities by MOHE

Funding text

Manuscript received 5 May, 2017; accepted 19 August, 2017. This research was funded by FRGS project from the Ministry of Education, Malaysia. This research was performed in cooperation with the Universiti Tenaga Nasional Malaysia.

ISSN: 13921215

Source Type: Journal

Original language: English

DOI: 10.5755/j01.eie.23.5.19249

Document Type: Article

Publisher: Kauno Technologijos Universitetas

References (19)

[View in search results format](#) >

All [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)

Metrics ?

0 Citations in Scopus

0 Field-Weighted
Citation Impact



PlumX Metrics ∨

Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 0 documents

Inform me when this document
is cited in Scopus:

[Set citation alert](#) >

[Set citation feed](#) >

Related documents

Throughput evaluation for the
downlink scenario of co-tier
interference in heterogeneous
network

Hasan, M.K. , Ismail, A.F. ,
Abdalla, A.-H.
(2015) *ARPN Journal of
Engineering and Applied
Sciences*

Throughput maximization for the
cross-tier interference in
heterogeneous network

Hasan, M.K. , Ismail, A.F. ,
Abdalla, A.-H.
(2016) *Advanced Science Letters*

Comparison of inter-cell
interference models for cellular
networks

Osterbo, O. , Grondalen, O.
(2014) *EuCNC 2014 - European
Conference on Networks and
Communications*

[View all related documents based
on references](#)

- 1 Hasan, M.K., Ismail, A.F., Abdalla, A.-H., Abdullah, K., Ramli, H.A.M., Islam, S., Badron, K.
Self-organizing joint sensing and power allocation scheme (SJSIPA) to coordinate cross-tier interference for LTE-A heterogeneous networks
(2014) *ISTT 2014 - 2014 IEEE 2nd International Symposium on Telecommunication Technologies*, art. no. 7238168, pp. 11-16. Cited 2 times.
ISBN: 978-147995982-2
doi: 10.1109/ISTT.2014.7238168
[View at Publisher](#)
-
- 2 Hasan, M.K., Ismail, A.F., Abdalla, A.H., Ramli, H.A.M., Hashim, W., Razzaque, A., Khairolanuar, M.H.
A self-organizing approach: Time synchronization for the HeNodeBs in heterogeneous network
(2016) *Lecture Notes in Electrical Engineering*, 362, pp. 365-374.
<http://www.springer.com.ezlib.iium.edu.my/series/7818>
ISBN: 978-331924582-9
doi: 10.1007/978-3-319-24584-3_30
[View at Publisher](#)
-
- 3 Hasan, M.K., Ismail, A.F., Aisha, H.A., Abdullah, K., Ramli, H., Islam, S., Nafi, N., (...), Mohamad, H.
Inter-cell interference coordination in Heterogeneous Network: A qualitative and quantitative analysis
(2013) *2013 IEEE 11th Malaysia International Conference on Communications, MICC 2013*, art. no. 6805855, pp. 361-366. Cited 4 times.
doi: 10.1109/MICC.2013.6805855
[View at Publisher](#)
-
- 4 Hasselbach, P.P., Klein, A.
An analytic model for outage probability and bandwidth demand of the downlink in packet switched cellular mobile radio networks
(2008) *IEEE International Conference on Communications*, art. no. 4533090, pp. 252-256. Cited 6 times.
ISBN: 978-142442074-2
doi: 10.1109/ICC.2008.54
[View at Publisher](#)
-
- 5 Oh, D.-C., Lee, Y.-H.
Cognitive Radio Based Resource Allocation in Femto-Cells
(2012) *Journal of Communications and Networks*, 14 (3), pp. 252-256. Cited 14 times.
doi: 10.1109/JCN.2012.6253085
[View at Publisher](#)
-
- 6 Shahid, A., Aslam, S., Lee, K.-G.
A decentralized heuristic approach towards resource allocation in femtocell networks
(2013) *Entropy*, 15 (7), pp. 2524-2547. Cited 11 times.
<http://www.mdpi.com/1099-4300/15/7/2524/pdf>
doi: 10.3390/e15072524
[View at Publisher](#)
-
- 7 Han, K., Choi, Y., Kim, D., Na, M., Choi, S., Han, K.
Optimization of femtocell network configuration under interference constraints
(2009) *7th Int. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, (WIOPT 2009)*, pp. 1-7. Cited 30 times.
Online
<http://dx.doi.org/10.1109/WIOPT.2009.5291642>

Find more related documents in Scopus based on:

Authors > Keywords >

- 8 Chang, R.Y., Tao, Z., Zhang, J., Kuo, C.-C.J.
Dynamic fractional frequency reuse (D-FFR) for multicell OFDMA networks using a graph framework

(2013) *Wireless Communications and Mobile Computing*, 13 (1), pp. 12-27. Cited 18 times.
doi: 10.1002/wcm.1088

[View at Publisher](#)

- 9 Hasan, M.K., Ismail, A.F., Abdalla, A.H., Abdullah, K., Ramli, H., Islam, S., Saeed, R.A.
Inter-cell interference coordination in LTE-A HetNets: A survey on self organizing approaches

(2013) *Proceedings - 2013 International Conference on Computer, Electrical and Electronics Engineering: 'Research Makes a Difference', ICCEEE 2013*, art. no. 6633932, pp. 196-201. Cited 8 times.

ISBN: 978-146736231-3

doi: 10.1109/ICCEEE.2013.6633932

[View at Publisher](#)

- 10 Kim, Y., Lee, S., Hong, D.
Performance analysis of two-tier femtocell networks with outage constraints

(2010) *IEEE Transactions on Wireless Communications*, 9 (9), art. no. 5518774, pp. 2695-2700. Cited 94 times.

doi: 10.1109/TWC.2010.070910.090251

[View at Publisher](#)

- 11 Martin, H.
(2012) *Stochastic Geometry for Wireless Networks*
Cambridge University Press

- 12 Dhillon, H.S., Ganti, R.K., Baccelli, F., Andrews, J.G.
Modeling and analysis of K-tier downlink heterogeneous cellular networks

(2012) *IEEE Journal on Selected Areas in Communications*, 30 (3), art. no. 6171996, pp. 550-560. Cited 774 times.

doi: 10.1109/JNSAC.2012.120405

[View at Publisher](#)

- 13 Andrews, J.G., Baccelli, F., Ganti, R.K.
A tractable approach to coverage and rate in cellular networks

(2011) *IEEE Transactions on Communications*, 59 (11), art. no. 6042301, pp. 3122-3134. Cited 1251 times.

doi: 10.1109/TCOMM.2011.100411.100541

[View at Publisher](#)

- 14 Yavuz, M., Meshkati, F., Nanda, S., Pokhariyal, A., Johnson, N., Raghothaman, B., Richardson, A.
Interference management and performance analysis of UMTS/HSPA+ femtocells

(2009) *IEEE Communications Magazine*, 47 (9), art. no. 5277462, pp. 102-109. Cited 195 times.

doi: 10.1109/MCOM.2009.5277462

[View at Publisher](#)

□ 15 Zhang, J., Tian, H., Tian, P., Huang, Y., Gao, L.
Dynamic frequency reservation scheme for interference coordination in LTE-advanced heterogeneous networks
(2012) *IEEE Vehicular Technology Conference*, art. no. 6239915. Cited 16 times.
ISBN: 978-146730990-5
doi: 10.1109/VETECS.2012.6239915
[View at Publisher](#)

□ 16 (2009) *Guidelines for Evaluation of Radio Interface Technologies for Imt-advanced*. Cited 608 times.
ITU-M.2135-1, "Series, M", Technical report, ITU

□ 17 Kang, X., Zhang, R., Liang, Y.-C., Garg, H.K.
Optimal power allocation strategies for fading cognitive radio channels with primary user outage constraint
(2011) *IEEE Journal on Selected Areas in Communications*, 29 (2), art. no. 5701691, pp. 374-383. Cited 151 times.
doi: 10.1109/JSA.2011.110210
[View at Publisher](#)

□ 18 Zhou, F., Beaulieu, N.C., Li, Z., Si, J., Qi, P.
Energy-Efficient Optimal Power Allocation for Fading Cognitive Radio Channels: Ergodic Capacity, Outage Capacity, and Minimum-Rate Capacity
(2016) *IEEE Transactions on Wireless Communications*, 15 (4), art. no. 7358164, pp. 2741-2755. Cited 21 times.
<http://ieeexplore.ieee.org.ezlib.iium.edu.my/xpl/RecentIssue.jsp?puNumber=7693>
doi: 10.1109/TWC.2015.2509069
[View at Publisher](#)

□ 19 Liu, Z., Yuan, Y., Fu, L., Guan, X.
Outage performance improvement with cooperative relaying in cognitive radio networks
(2017) *Peer-to-Peer Networking and Applications*, 10 (1), pp. 184-192. Cited 2 times.
<http://www.springer.com.ezlib.iium.edu.my/engineering/signals/journal/12083>
doi: 10.1007/s12083-015-0417-0
[View at Publisher](#)

© Copyright 2017 Elsevier B.V., All rights reserved.

[< Back to results](#) | 1 of 2 [Next >](#)

[^ Top of page](#)

About Scopus

[What is Scopus](#)
[Content coverage](#)
[Scopus blog](#)
[Scopus API](#)
[Privacy matters](#)

Language

[日本語に切り替える](#)
[切换到简体中文](#)
[切换到繁體中文](#)
[Русский язык](#)

Customer Service

[Help](#)
[Contact us](#)

