Springer Link

Transient QoS Measure for Call Admission Control in WCDMA System with MIMO

International Workshop on Quality of Service in Multiservice IP Networks

QoS-IP 2004: Quality of Service in Multiservice IP Networks pp 545-558 | Cite as

- Cheol Yong Jeon (1)
- Yeong Min Jang (1)

1. School of Electrical Engineering, Kookmin University, , Seoul, Korea

Conference paper

- 419 Downloads

Abstract

This paper presents an efficient capacity evaluation algorithm of the WCDMA with multiple-input multiple-output (MIMO) system for quality of service (QoS) support. To define the capacity of the system, we derive the E_b/N_o gain taking into account MIMO concept and the outage probability as the QoS measure using central limit approximation, Chernoff bound and the refined large deviation approach. Based on the QoS measures, we propose an efficient transient call admission control (CAC) algorithm. Numerical results show that there is a substantial increment in system capacity by adopting MIMO system and the theory of the refined large deviation approach is a good approach for transient QoS support.

Keywords

Outage Probability   MIMO System   Ergodic Capacity
Wideband Code Division Multiple Access   Connection Admission Control

These keywords were added by machine and not by the authors. This process is experimental and the keywords may be updated as the learning algorithm improves.

This is a preview of subscription content, log in to check access.

Preview

Unable to display preview. Download preview PDF.

References

1.   Haykin, S., Moher, M.: Modern Wireless Communications, pp. 339–376. Pearson Prentice Hall, London (2005)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Modern%20Wireless%20Communications&author=S..%20Haykin&author=M..%20Moher&publication_year=2005)

2.   Ojanrera, T., Prasad, R.: WCDMA: Towards IP Mobility and Mobile Internet. Artech House, Inc. (1998)
Google Scholar (https://scholar.google.com/scholar?q=Ojanrera%2C%20T.%2C%20Prasad%2C%20R.%3A%20WCDMA%3A%20Towards%20IP%20Mobility%20and%20Mobile%20Internet.%20Artech%20House%2C%20Inc.%20%281998%29)

3.   Yang, S.C.: CDMA RF System Engineering, pp. 75–83. Artech House Inc. (1998)

Google Scholar (https://scholar.google.com/scholar?
q=Yang%2C%20S.C.%3A%20CDMA%20RF%20System%20Engineering%2C
%20pp.%2075%E2%80%9383.%20Artech%20House%20Inc.%20%281998%
29)

4.   Massimiliano, M.: Multiantenna Digital Radio Transmission, pp. 113–119.
      Artech House, Inc. (2002)
      Google Scholar (https://scholar.google.com/scholar?
      q=Massimiliano%2C%20M.%3A%20Multiantenna%20Digital%20Radio%20
      Transmission%2C%20pp.%20113%E2%80%93119.%20Artech%20House%2C
      %20Inc.%20%282002%29)

5.   Smith, P.J., Shafi, M.: On a Gaussian approximation to the capacity of
      wireless MIMO systems. IEEE ICC (May 2002)
      Google Scholar (https://scholar.google.com/scholar?
      q=Smith%2C%20P.J.%2C%20Shafi%2C%20M.%3A%20On%20a%20Gaussia
      n%20approximation%20to%20the%20capacity%20of%20wireless%20MIMO
      %20systems.%20IEEE%20ICC%20%28May%202002%29)

6.   IEEE Comm. Magazine (July 1997)
      Google Scholar (https://scholar.google.com/scholar?
      q=IEEE%20Comm.%20Magazine%20%28July%201997%29)

7.   Roberts, J., Mocci, U., Virtamo, J. (eds.): Broadband network teletraffic:
      performance evaluation and design of broadband multiservice networks, Final
      report of Action COST 242 (1996)
      Google Scholar (https://scholar.google.com/scholar?
      q=Roberts%2C%20J.%2C%20Mocci%2C%20U.%2C%20Virtamo%2C%20J.%
      20%28eds.%29%3A%20Broadband%20network%20teletraffic%3A%20perfor
      mance%20evaluation%20and%20design%20of%20broadband%20multiservi
      ce%20networks%2C%20Final%20report%20of%20Action%20COST%20242
      %20%281996%29)

8.   Elwalid, A., Mitra, D., Wentworth, R.: A new approach for allocating buffers
      and bandwidth to heterogeneous, related traffic in an ATM node. IEEE JSACs
      (August 1995)
      Google Scholar (https://scholar.google.com/scholar?
      q=Elwalid%2C%20A.%2C%20Mitra%2C%20D.%2C%20Wentworth%2C%20
      R.%3A%20A%20new%20approach%20for%20allocating%20buffers%20and
      %20bandwidth%20to%20heterogeneous%2C%20related%20traffic%20in%2
      0an%20ATM%20node.%20IEEE%20JSACs%20%28August%201995%29)

9.   Mao, G., Habibi, D.: Heterogeneous On-Off sources in the bufferless fluid flow
      model. IEEE ICON, 307–312 (2000)

Google Scholar (https://scholar.google.com/scholar?
q=Mao%2C%20G.%2C%20Habibi%2C%20D.%3A%20Heterogeneous%20On
-
Off%20sources%20in%20the%20bufferless%20fluid%20flow%20model.%20
IEEE%20ICON%2C%20307%E2%80%93312%20%282000%29)

10. Lozano, A., Tulino, A.M., Verdu, S.: Correlation number: a new design
criterion in multi-antenna communication. IEEE VTC (April 2003)
Google Scholar (https://scholar.google.com/scholar?
q=Lozano%2C%20A.%2C%20Tulino%2C%20A.M.%2C%20Verdu%2C%20S.
%3A%20Correlation%20number%3A%20a%20new%20design%20criterion%
20in%20multi-
antenna%20communication.%20IEEE%20VTC%20%28April%202003%29)

11. Tulino, A.M., Verdu, S., Lozano, A.: Capacity of antenna arrays with space,
polarization and pattern diversity. IEEE ITW (April 2003)
Google Scholar (https://scholar.google.com/scholar?
q=Tulino%2C%20A.M.%2C%20Verdu%2C%20S.%2C%20Lozano%2C%20A.
%3A%20Capacity%20of%20antenna%20arrays%20with%20space%2C%20p
olarization%20and%20pattern%20diversity.%20IEEE%20ITW%20%28April
%202003%29)

12. Verdu, S.: Spectral efficiency in the wideband regime. IEEE Trans. on
Information Theory 48(6) (June 2002)
Google Scholar (https://scholar.google.com/scholar?
q=Verdu%2C%20S.%3A%20Spectral%20efficiency%20in%20the%20wideba
nd%20regime.%20IEEE%20Trans.%20on%20Information%20Theory%C2%
A048%286%29%20%28June%202002%29)

13. Jang, Y.M.: Estimation and prediction based connection admission control in
broadband satellite systems. ETRI Journal, 40–50 (2000)
Google Scholar (https://scholar.google.com/scholar?
q=Jang%2C%20Y.M.%3A%20Estimation%20and%20prediction%20based%2
0connection%20admission%20control%20in%20broadband%20satellite%20
systems.%20ETRI%20Journal%2C%2040%E2%80%9350%20%282000%29
)

14. Leon-Garcia, A.: Probability and Random Processes for Electrical
Engineering. Addison-Wesley, Reading (1994)
Google Scholar (http://scholar.google.com/scholar_lookup?
title=Probability%20and%20Random%20Processes%20for%20Electrical%20
Engineering&author=A..%20Leon-Garcia&publication_year=1994)

15. Luo, X., Thng, I., Jiang, S.: A simplified distributed call admission control
scheme for mobile cellular networks. ICT (1999)

Google Scholar (https://scholar.google.com/scholar?
q=Luo%2C%20X.%2C%20Thng%2C%20I.%2C%20Jiang%2C%20S.%3A%20
A%20simplified%20distributed%20call%20admission%20control%20scheme
%20for%20mobile%20cellular%20networks.%20ICT%20%281999%29)

16.   Hui, J.: Switching and Traffic Theory for Integrated Broadband Networks.
       Kluwer, Boston (1990)
       zbMATH (http://www.emis.de/MATH-item?0711.94023)
       Google Scholar (http://scholar.google.com/scholar_lookup?
       title=Switching%20and%20Traffic%20Theory%20for%20Integrated%20Broa
       dband%20Networks&author=J..%20Hui&publication_year=1990)

17.   Reisslein, M.: Measurement-based admission control: a large deviations
       approach for bufferless multiplexers. In: IEEE Symposium on Computers and
       Communications, July 2000, pp. 462–467 (2000)
       Google Scholar (https://scholar.google.com/scholar?
       q=Reisslein%2C%20M.%3A%20Measurement-
       based%20admission%20control%3A%20a%20large%20deviations%20appro
       ach%20for%20bufferless%20multiplexers.%20In%3A%20IEEE%20Symposi
       um%20on%20Computers%20and%20Communications%2C%20July%20200
       0%2C%20pp.%20462%E2%80%93467%20%282000%29)

Copyright information

About this paper

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.

fastcase
Smarter legal research.