



Abstract

[XML](#) [RSS](#) [Bookmark this Site](#) [Bookmark this Journal](#) [Bookmark this Article](#)

[Login](#)
[News](#)
[Archive](#)
[Coming Issue](#)
[Current Issue](#)
[Free Download](#)
[Full Text](#)
[Indexing](#)
[Introduction](#)
[Links](#)
[Online Submission](#)
[People](#)
[Search](#)
[Subscription Rate](#)

Volume 17 - 3 - Transactions B: Applications, October 2004, pp. 247-264

A TWO-THRESHOLD GUARD CHANNEL SCHEME FOR MINIMIZING BLOCKING PROBABILITY IN COMMUNICATION NETWORKS

Hamid Beigy

*Department of Computer Engineering, Sharif University of Technology
Tehran, Iran, beigy@ce.sharif.edu*

M. R. Meybodi

*Department of Computer Engineering, Amirkabir University of Technology
Tehran, Iran, meybodi@ce.aut.ac.ir*

(Received: March 04, 2003 – Accepted in Revised Form: June 10, 2004)

Abstract In this paper, we consider the call admission problem in cellular network with two classes of voice users. In the first part of paper, we introduce a two-threshold guard channel policy and study its limiting behavior under the stationary traffic. Then we give an algorithm for finding the optimal number of guard channels. In the second part of this paper, we give an algorithm, which minimizes the number of channels subject to hard constraints on the blocking and dropping probabilities of calls. Finally, we propose an optimal prioritized channel assignment for multi-cells cellular networks with two classes of voice users.

Keywords Call Admission Control, Guard Channels, Two-Threshold Guard Channels, Wireless Networks

چکیده در این مقاله مسئله کنترل پذیرش درخواست ها در شبکه های سیار سلولی با دو سرویس صوتی بررسی می شود. در بخش اول مقاله، روش کانال اختیاط دو آستانه ای ارائه و رفتار آن برای ترافیک های ایستا بررسی می گردد. سپس الگوریتمی برای پیدا کردن تعداد بهینه کانال های اختیاط ارائه می شود. در بخش دوم مقاله، با توجه به محدودیت احتمال قطع رد درخواستها، الگوریتمی برای پیدا کردن تعداد کمینه کانال های مورد نیاز سلول ارائه می گردد. در انتها، یک الگوریتم انتساب کانال اولویت دار برای شبکه های سلولی سیار با دو سرویس صوتی ارائه می شود.

References

- Lin, Y. B., Mohan, S. and Noerpel, A., "Queuing Priority Channel Assignment Strategies for PCS Handoff and Initial Access", *IEEE Transactions on Vehicular Technology*, Vol. 43, (August 1994), 704-712.
- Hong, D. and Rappaport, S., "Traffic Modeling and Performance Analysis for Cellular Mobile Radio Telephone Systems with Prioritized and Non-prioritized Handoffs Procedure",

IEEE Transactions on Vehicular Technology, Vol. 35, (August 1986), 77-92.

3. Oh, S. and Tcha, D., "Prioritized Channel Assignment in a Cellular Radio Network", *IEEE Transactions on Communications*, Vol. 40, (July 1992), 1259-1269.
4. Haring, G., Marie, R., Puigjaner, R. and Trivedi, K., "Loss Formulas and Their Application to Optimization for Cellular Networks", *IEEE Transactions on Vehicular Technology*, Vol. 50, (May 2001), 664-673.
5. Ramjee, R., Towsley, D. and Nagarajan, R., "On Optimal Call Admission Control in Cellular Networks", *Wireless Networks*, Vol. 3, (1997), 29-41.
6. Beigy, H. and Meybodi, M. R., "A New Fractional Channel Policy", *Journal of High Speed Networks*, Vol. 13, No. 1, (2004), 25-36.
7. Yoon, C. H. and Kwan, C., "Performance of Personal Portable Radio Telephone Systems with and without Guard Channels", *IEEE Journal on Selected Areas in Communications*, Vol. 11, (August 1993), 911-917.
8. Guern, R., "Queuing-Blocking System with Two Arrival Streams and Guard Channels", *IEEE Transactions on Communications*, Vol. 36, (February 1988), 153-163.
9. Senouci, S. M., Beylot, A. L. and Pujolle, G., "A Dynamic Q-Learning-Based Call Admission Control for Multimedia Cellular Networks", *In Proceedings of the 3rd IEEE International Conference in Mobile and Wireless Communication Networks, MWCN2001*, Recife, Brazil, (August 2001), (37-43).
10. Chen, G. C. and Lee, S. Y., "Modeling of Static and Dynamic Guard Channel Schemes for Mobile Transactions", *IEICE Transactions on Information and Systems*, Vol. E84-D, (January 2001), 87-99.
11. Senouci, S. M., Beylot, A. L. and Pujolle, G., "Call Admission Control for Multimedia Cellular Networks Using Neuro-Dynamic Programming", *In Proceedings of the IFIP Networking, NETWORKING'02*, Pisa, Italy, (May 2002).
12. Beigy, H. and Meybodi, M. R., "An Adaptive Limited Fractional Guard Channel Policy Using Continuous Action Learning Automata", *In Proceedings of the 10th IEEE International Conference on Software, Telecommunications and Computer Networks*, Croatia, Italy, (October 2002).
13. Beigy, H. and Meybodi, M. R., "A Learning Automata Based Dynamic Guard Channel Scheme", Vol. 2510 of Springer-Verlag Lecture Notes in Computer Science, Springer-Verlag, Shiraz, (October 2002), 643-650.
14. Beigy, H. and Meybodi, M. R., "Adaptive Uniform Fractional Channel Algorithms", *Iranian Journal of Electrical and Computer Engineering*, Vol. 3, No. 1, (2004), 47-53.
15. Yin, L., Li, B., Zhang, Z. and Lin, Y., "Performance Analysis of a Dual-Threshold Reservation (DTR) Scheme for Voice/Data Integrated Mobile Wireless Networks", *In Proceedings of the IEEE Wireless Communications and Networking Conference, WCNC. 2000*, (September 2000), 258-262.
16. Herzog, U., Woo, L. and Chandy, K., "Solution of Queuing Problems by a Recursive Techniques", *IBM Journal of Research and Development*, Vol. 19, No. 3, (May 1975), 295-300.
17. Kleinrock, L., "Queuing Theory: Volume 1- Theory", John Wiley and Sons, New York, (1975).



[Term of Use](#) | [Privacy Policy](#) | [Contact Us](#)

International Journal of Engineering
E-mail: office@ijeir.info
Web Site: <http://www.ijeir.info>