Stability of bandwidth request control based on dual feedback in BWA networks

Tuan N.Q., Nguyen D.-T.

College of Technology, Vietnam National University, Hanoi, Viet Nam; Faculty of Engineering and Information Technology, University of Technology Sydney, Sydney, NSW, Australia

Abstract: In order for the base station to respond quickly and efficiently to the uplink bandwidth request in broadband wireless access (BWA) networks using time-division duplex (TDD), a dual feedback control algorithm has recently been proposed [3]. In this algorithm the bandwidth request is adjusted in accordance with both the length of the backlogged queue and the mismatch between packet arrival and service rates. This paper presents a thorough study of the stability of the dual feedback algorithm in both continuous-time and discrete-time domains. It turns out that the stability condition in [3] is necessary but not sufficient to guarantee the stability of its discrete-time implementation. ??2009 IEEE.

Index Keywords: Bandwidth request; Broadband wireless accesss; Continuous time; Discrete-time; Discrete-time domain; Dual feedback; Dual feedback control; Packet arrivals; Service rates; Stability condition; Time division duplex; Uplink bandwidth; Access control; Algorithms; Bandwidth; Wireless networks; Stability

Year: 2009
Source title: IEEE Region 10 Annual International Conference, Proceedings/TENCON
Art. No.: 5395946
Link: Scorpus Link
Correspondence Address: Tuan, N. Q.; College of Technology, Vietnam National University, Hanoi, Viet Nam; email: tuannq@vnu.edu.vn
Conference name: 2009 IEEE Region 10 Conference, TENCON 2009
Conference date: 23 November 2009 through 26 November 2009
Conference location: Singapore
Conference code: 79857
ISBN: 9.78E+12
CODEN: 85QXA
DOI: 10.1109/TENCON.2009.5395946
Language of Original Document: English
Abbreviated Source Title: IEEE Region 10 Annual International Conference, Proceedings/TENCON
Document Type: Conference Paper
Source: Scopus
Authors with affiliations:

1. Tuan, N.Q., College of Technology, Vietnam National University, Hanoi, Viet Nam
2. Nguyen, D.-T., Faculty of Engineering and Information Technology, University of Technology Sydney, Sydney, NSW, Australia

References:

1. IEEE standard for local and metropolitan area networks part 16: Air interface for fixed and mobile broadband wireless access systems, Amendment 2 (2005) IEEE 802.16 Standard, , December
2. Wongthavarawat, K., Ganz, A., Packet scheduling for QoS support in IEEE 802.16 broadband wireless access systems (2003) International Journal of Communication Systems, 16, pp. 81-96
3. Song, G., Li, Y., Cimini, J.L.J., Zheng, H., Joint channel-aware and queue-aware data scheduling in multiple shared wireless channels (2004) Proc. IEEE Wireless Communications and Networking Conference (WCNC), 3, pp. 1939-1944
4. Park, E.C., Kim, H.N., Kim, J.Y., Kim, H.S., Dynamic Bandwidth Request - Allocation Algorithm for Real-Time Services in IEEE 802.16 Broadband Wireless Access Networks IEEE Transaction on Mobile Computing, 8 (9), p. 2008