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Joint multi-user detection and intersymbol interference cancellation for WCDMA satellite UMTS

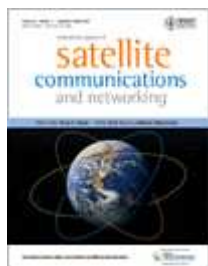
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Article first published online: 28 JAN 2003

DOI: 10.1002/sat.747

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Issue



International Journal of Satellite Communications and Networking

Special Issue: Interference Suppression Techniques for Satellite Systems

Volume 21, Issue 1, (/doi/10.1002/sat.v21:1/issuetoc) pages 93–117, January/February 2003

Additional Information

How to Cite

da Silva, M. M. and Correia, A. M. C. (2003), Joint multi-user detection and intersymbol interference cancellation for WCDMA satellite UMTS. *Int. J. Satell. Commun. Network.*, 21: 93–117. doi: 10.1002/sat.747

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Publication History

1. Issue published online: 28 JAN 2003
2. Article first published online: 28 JAN 2003

3. Manuscript Received: 18 OCT 2002

- Abstract
- [References \(/doi/10.1002/sat.747/references\)](/doi/10.1002/sat.747/references)
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Keywords:

S-UMTS; intersymbol interference; multiple access interference; commutation signaling; orthogonal code-di

Abstract

In this work we present two different intersymbol interference (ISI) cancellation systems, namely the commutation signaling (CS) and orthogonal code-division transmit diversity (O-CDTD) in combination with satellite path diversity, which leads to a high diversity order. The ISI is due to the use of satellite path diversity (in order to introduce multipath diversity artificially). This work combines the proposed ISI cancellation systems with subtractive multi-user detectors—a variation of the conventional parallel interference cancellation (PIC) and successive interference cancellation (SIC) for the downlink channel of S-UMTS. The blind detection is also considered without knowledge of spreading sequences or the channel state information (CSI) of the interfering users with a noise whitening matched filter (NWMF) that combats the MAI through the whitening of the interfering power spectrum, also with and without the ISI cancellation systems—CS and O-CDTD. It is shown that the proposed PIC is a very promising detector to be used for the downlink of S-UMTS, especially when combined with CS or O-CDTD, the NWMF being efficient only when we consider jointly any of the proposed ISI cancellation systems for low number of interfering users. Copyright © 2003 John Wiley & Sons, Ltd.

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