

**LOW-COMPLEXITY LINK ADAPTATION FOR ENERGY
EFFICIENCY MAXIMIZATION IN MIMO-OFDM
SYSTEMS**

MICANS INEOTECH

ABSTRACT

- We present a low-complexity link adaptation algorithm for maximizing the energy efficiency (EE) of MIMOOFDM systems. We prove that the energy efficiency is a single peaked quasiconcave function of the transmit power and develop an iterative algorithm to find near-optimal transmit power.
- We further prune the search space by analyzing the singular values of the channel. The resulting link adaptation protocol achieves orders of magnitude reduction in complexity compared to the brute force search method without noticeably sacrificing the performance.

MICANS INEOTECH



EXISTING SYSTEM

- An energy-efficient water-filling power allocation scheme is proposed for SISOOFDM systems, where it was proven that the EE can be maximized by adapting the transmit power and its allocation to sub channels.
- Iterative water-filling and mode selection strategies were proposed for energy efficiency maximization in MIMO-OFDM systems, where the mode selection was limited to number of transmit and receive antennas.

MICANS INFO TECH



PROPOSED SYSTEM

- The proposed protocol frequently changes the operating mode in an opportunistic manner to track the fast fading changes in the channel.
- The optimal mode is therefore dependent on the instantaneous characteristics of the channel. However, it is still important to draw conclusions about the general trends of the mode selection as a function of SNR changes.

MICANS INFO TECH



HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

MICANS INFOTECH



SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

MICANS INFOTECH



REFERENCES

- [1] S. Cui, A. J. Goldsmith, and A. Bahai, “Energy-constrained modulation optimization,” *IEEE Trans. on Wireless Commun.*, vol. 4, no. 5, 2005.
- [2] H. S. Kim and B. Daneshrad, “Energy-constrained link adaptation for MIMO OFDM wireless communication systems,” *IEEE Trans. on Wireless Commun.*, vol. 9, no. 9, pp. 2820–2832, Sep. 2010.
- [3] D. Feng et al., “A survey of energy-efficient wireless communications,” *IEEE Commun. Surveys & Tutorials*, vol. 15, no. 1, pp. 167–178, 2012.
- [4] G. Miao, N. Himayat, and G. Y. Li, “Energy-efficient link adaptation in frequency-selective channels,” *IEEE Trans. on Commun.*, vol. 58, no. 2, pp. 545–554, 2010.

